FORESTRY ABSTRACTS

VOLUME 15 1954 NUMBER 3

ABSTRACT SECTION

0. FORESTS, FORESTRY, AND THE UTILIZATION OF FOREST PRODUCTS: GENERAL

For general *regional* accounts see section 90

TRANSLATIONS

See Nos. 2258–9, 2348, 2475, 2567, 2583, 2812, 2828, 2850, 2870, 2898, 2972, 3020, 3024, 3032, 3056.

0 (02). HANDBOOKS. MANUALS. TEXTBOOKS

2178. **Forestry handbook for British Columbia.** Forest Club, University of British Columbia, Vancouver. 1953. pp. 363. Price $Can. 3·00.

0 (048.1). BIBLIOGRAPHICAL LISTS

See also Nos. 2592, 2595, 2811.

2179. Bibliographie des ausländischen forst- und holzwirtschaftlichen Schrifttums: Folge 6 enthält Titel des Jahres 1951–52. **[Bibliography of foreign literature on forestry and wood utilization: No. 6—titles of 1951–52.]** *Mitt. Bundesanst. Forst- u. Holzw.* No. 32, 1953. pp. vii + 251. [G.] Price [£1. 7*s.* 0*d.*]

0 (05). PERIODICALS. YEARBOOKS. DIRECTORIES. ALMANACS, CALENDARS, DIARIES

See also Nos. 2437, 2549, 2784, 2795, 3160.

2180. *Der Forst- und Holzwirt.* Professor Dr. Dr. K. Mantel, Verlag M. & H. Schaper, Hannover. Semi-monthly. Price *DM.* 19·60 p.a.

Previously *Forst und Holz.* Vol. 1, No. 1 was issued under the new title in January, 1954. The journal now appears in two parts, A and B. The supplement *Der deutsche Forstmann* is now issued with part B. In its new form the journal will concentrate mainly on economics and legal aspects. Abbreviation in *For. Abstr.: Forst- u. Holzw.*

2181. ***Az Erdö.*** Országos Erdészeti Egyesület, Nyári Pál-utca 9, Budapest, V. Quarterly. Price *Forints* 40 p.a.

This journal, 'The Forest', presumably supersedes *Erdészeti Lapok*, which ceased publication in 1950. Vol. 1, No. 1, issued in August 1952, contains 100 pages. Each article has a Russian summary and a summary in English, French or German. Citation in *For. Abstr.: Erdö.*

2182. ***Ikurin Syooroku* (*Silvicultural Abstracts*).** Department of Agriculture and Forestry, Forestry Experiment Station, Meguro, Tokyo Quarterly. Price not given.

Volume I, 1951, contains 1221 abstracts, all in Japanese and confined to Japanese forestry literature; arrangement is by U.D.C. This volume covers periodicals from 1950 and other literature from 1949. Each issue contains a list of publications noticed in that issue. The abstracts are obtained chiefly from authors.

2183. **Directory of institutions engaged in arid zone research.** *Arid Zone Programme, Unesco, Paris* No. 3, 1953. pp. xi + 110. Price 8*s.* 6*d.*

0 (084.3/4). MAPS AND ATLASES

See also No. 2220.

2184. Weltforstatlas. **[World forestry atlas [part].]** Fritz Haller Verlag, Berlin-Grünewald. 1953. [G.E.F.Span.]

[Cf. *For. Abstr.* 14 (No. 2967).] Further map sheets, as follows:—Denmark (forest distribution); Rumania (forest distribution); Ukraine (forest distribution); and Bulgaria (distribution of Oak, Beech, Pine, high forest and coppice; distance of forests from (*a*) railways and (*b*) 1st- and 2nd-class roads).

0 - - 011. TERMINOLOGY. NOMENCLATURE

See also Nos. 2298, 2302, 2501, 2591, 2649.

2185. S., J. F. **[Draft for official Japanese forestry terminology.]** *J. Jap. For. Soc.* 35 (10), 1953 (326–33). [Jap.]

First part of a draft sponsored by the Ministry of Education in 1950 and collated by a forestry committee up to 1953. It is divided into broad subject heads and put forward in both Chinese and Kana script for further criticism.

0 - - 014. CLASSIFICATION

2186. FLICK, F. J. **Classification schemes for forestry.** *J. For.* 52 (3), 1954 (201–2). 17 refs. [U.S. Department of Agriculture Library, Washington.]

A short note on a number of schemes for classification of forestry literature.

11. SITE FACTORS: CLIMATE, SITUATION, SOIL, HYDROLOGY (WATER AND SOIL CONSERVATION)

2187. JONES, E. W. **Applied forest ecology.** *Quart. J. For.* 48 (1), 1954 (24–8).

A critical review of *F. Hartmann:* 'Forstökologie'. [Cf. *For. Abstr.* 14 (No. 1867).]

111. *The Atmosphere. Meteorology. Climate and Microclimate*

111.2. Radiation and Temperature

See also No. 2746.

2188. ROUSSEL, L. Comment les plantes perçoivent la lumière. **[How plants perceive light.]** *Rev. for. franç.* 5 (12), 1953 (843–8). [F.]

Describes the use of a green filter for measuring relative illumination under forest stands by the photoelectric-cell method. The advantage of this is that the light measured approximates closely to that absorbed by a chlorophyll-charged leaf, i.e. mainly the blue and red parts of the spectrum. The filter used was the Kodak Wratten No. 34.

111.7. Humidity, Evaporation, Precipitation

See also Nos. 2234–9.

2189. PRAT, H. **Fog as a dominant factor for plant life on some parts of the Pacific Coast of North America.** *Proceedings of the 7th Pacific Science Congress, New Zealand, 1949* Vol. 5 (Botany), 1953. pp. 152–6. 11 refs. Government Printer, Wellington.

111.8. Climatology. Climate and Microclimate

See also Nos. 2236–7, 2261.

2190. HAWBOLDT, L. S., and BENSON, D. A. **Climatic change and some of its possible influences on living things.** *Bull. N.S. Dep. Lds. For.* No. 5 (rev.), 1953. pp. 7.

A lecture discussing possible effects of climatic changes in N. America on insect and game populations.

2191. **Desert research: proceedings of an international symposium held in Jerusalem, May 7–14, 1952.** *Special Publication, Research Council of Israel, Jerusalem* No. 2, 1953. pp. 644. Price £2. 5*s.*

Includes 50 papers on climate, biology, soils, and hydrology, some of which are noticed separately in this number of *Forestry Abstracts.* The greater number of the papers are in English, but a few are in French. [Cf. *For. Abstr.* 15 (Nos. 2183, 3127).]

2192. JACAMON, M. Les données climatologiques dans les recherches forestières. **[Climatological data in forest research.]** *Rev. for. franç.* 6 (4), 1954 (225–36 + 1 photo). 19 refs. [F.f.] [Station de Recherches et Expériences forestières, Nancy.]

Discusses the inadequacy for forest research of available data from national meteorological offices, airfields etc. on macroclimate and local climates, and describes some of the equipment suitable for collecting microclimatic data (rainfall, air humidity, temperatures, light and wind), stressing the need for continuity of observations and the value of co-operation with other interested bodies.

2193. KAROL, E. Badania mikroklimatyczne w zespołach roślinnych Puszczy Niepołomickiej. **[Microclimatic investigations in plant communities of the Puszcza Niepolomicka.]** *Acta Soc. Bot. Polon.* 22 (3), 1953 (483–59). 12 refs. [Pol.e.] O.B.D.

Presents comparative data on microclimate near ground level in (1) a forest community of the *Fraxineto-Carpinion,* (2) a meadow community, and (3) a marsh community. [Cf. *For. Abstr.* 15 (No. 2237).]

2194. LHOTSKÝ, J. K poznání prostředí kalamitních holin. **[The [soil] characteristics of clearings due to war activities, windfall and avalanches.]** *Lesn. Práce* 32 (8), 1953 (339–47). [Cz.]

Tabulates and graphs the results of microclimatic measurements at Varvažov, near Čížová (Czechoslovakia), in an experimental area containing clearings due to an avalanche (1939) and wind (1941). As a preliminary to planned reforestation, double furrows, 60 cm. wide and 15 cm. deep, with 30-cm.-wide furrow slices on either side, were ploughed at 2- to 3-m. intervals. A control (unploughed) area had a dense cover (mostly *Calamagrostis* spp.), and soil profile as follows: 0–15 cm., rhizosphere of the cover plants; 15–40 cm., brown sandy-loam layer without distinct structure; 40–60 cm., brownish semi-weathered material of sandy type, and below 60 cm., granite detritus. Measurements showed that the temperatures of the furrow and slices were different, the latter having as a rule, a higher daytime temperature. Evaporation, too, at a height of 10 cm. was greater above the slices. In one case, the difference between temperatures of furrow and slice (distance ca. 30 cm.) amounted to 27·9° C. The differences rapidly decrease with height, and nearly disappear at 50 cm. A similar gradient was found for soil temperatures, i.e. the temperature differences nearly disappeared at a depth of 1 m. The moisture content of the soil under (*a*) furrows, (*b*) slices, and (*c*) the weeds in the control plot, gave the following decreasing sequences: mid-June—depth 0–5 cm., (*c*)–(*a*)–(*b*); 5–10 cm., ditto; depth 10–20 cm., nearly equal (a much larger m.c. was found under slices on E. aspects); mid-July—0–5 cm., (*a*)–(*c*)–(*b*); 5–10 cm., (*c*)–(*a*)–(*b*); 10–20 cm., ditto; but again a high m.c. under slices on E. aspects; mid-October—0–5 cm., and 5–10 cm., (*a*)–(*c*)–(*b*); 10–20 cm., (*c*)–(*a*)–(*b*). The field moisture capacity gave parallel results. Tests of porosity, pH, N content, water permeability, and mechanical composition of the soil are also tabulated.

114. *Soil. Soil Science*

114.1. Soil Physics

See also Nos. 2194, 2208, 2220, 2236–7, 2256.

2195. RICHARD, F. Über die Verwertbarkeit des Bodenwassers durch die Pflanze. **[The utilization of soil moisture by plants.]** *Mitt. schweiz. Anst.*

forstl. Versuchsw. 29 (1), 1953 (17–37). 30 refs. [G.g.f.]

From the author's experiments it appears that permanent wilting point (PWP) varies with the character of the soil and is independent of species—there was no significant difference in the values for seedlings of *Pinus sylvestris*, *Alnus glutinosa* and dwarf sunflower. The richer the soil in fine particles, the higher the PWP. The soil water available for plants is theoretically the difference between field capacity (FC) and PWP, but knowledge of the FC of a soil is not sufficient to characterize its available soil-moisture. Thus a clayey soil may retain more capillary water than a silty soil, but the amount available for plants may be less because of its relatively higher PWP. The actual moisture content should, therefore, be constantly compared with PWP.

The author also insists on the importance of the force of retention of water by soils below FC. This may be expressed in terms of pressure. At FC, water is retained by a force equal to the pressure of a column of water of 345 cm. or ca. $\frac{1}{3}$ atm. At PWP the corresponding pressure is 15–16 atm. Experimental results so far show that these two values are almost constant for any given soil and are independent of species. The value is correlated with the diameter of pores: in a soil with large pores, water is retained by low pressures and in a soil with small pores by high pressures. In practice a plant can only draw from the soil, water retained at pressures not exceeding 15–16 atm., water more strongly bound to the soil being unavailable to plants. For these reasons, simple gravimetric determination of water content of soils gives no indication of the amounts available for plant use.

2196. Richard, F., and Beda, J. Methoden zur Bestimmung der Wasserbindung und der Porengrössen in natürlich gelagerten Waldböden. **[Methods of measuring soil moisture tension and pore size in undisturbed forest soil profiles.]** *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (2), 1953 (293–314). 8 refs. [G.g.f.]

Explains L. A. Richard's 'porous-plate' and 'pressure-membrane' methods, and illustrates their usefulness in investigation of two forest soil profiles —a brown loess soil in mixed broadleaved forest and the periodically flooded soil of a stand of Alder, Willow and Poplar.

2197. Zonn, S. V., and Alešina, A. K. O gazoobmene meždu počvoĭ i atmosferoĭ pod pologom lesnyh nasaždeniĭ. **[Gas exchange between soil and atmosphere under forest stands.]** *Dokl. Akad. Nauk SSSR* 92 (5), 1953 (1035–8). 4 refs. [Russ.] A.P.B.

Presents the results of some measurements of the rate of CO_2 evolution (in kg./ha./hr.) from soil and litter under (1) steppe vegetation, (2) ploughland, (3) a shelterbelt 60 m. wide [no further details given], and three 18- to 22-year plantations—(4) Oak/Ash/*Caragana arborescens*, (5) Oak/*Lonicera tatarica* and (6) pure Oak—at Derkul, Voroshilovgrad region, on shallow chernozems. For (4)–(6) the data relate to early, mid- and late Sept. 1952, and mid-May and mid-June 1953; for (1) no data are given for Sept., for (2) none for June and for (3) none for May or June. The rate of CO_2 evolution fell markedly in (2) towards mid-Sept., in (5) more gradually, only reaching its minimum late in the month; in (4), however, it remained practically constant throughout Sept. at a very high level, while in (6) its level, though lower and rather more variable, was, nevertheless, more than twice that of (2) and (5) at the end of the month. Results for (3) fluctuated greatly, probably owing to wind effects and uneven litter distribution. In May and June the highest rates were found for (5), the remaining cover types showing little difference among themselves.

Other observations in the same tree plantations plus an Oak/Ash plantation showed the rates of CO_2 evolution to be higher where a shrub layer was present and in this case, for much of the time, even if litter was absent [removed?].

In stands without a shrub layer the rates were higher where litter was present than where it was absent. The rates were higher in Sept. than in May or even, in some cases, June. In (4) a 50% reduction in tree canopy caused a sharp drop in CO_2 evolution from both litter and soil; removal only of *C. arborescens* had a similar but less marked effect. Some notes are included on the variation of CO_2 evolution during the course of one day (24 hr.) in late Sept. and one in early June.

2198. Malquori, A., and Cecconi, S. **Soil structure stability of some Sila soils [collected in the Sila Grande, Calabria] in relation to different forest plants.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 21 (No. 8), 1953. pp. 5. 1 ref. [E.] [Istituto di Chimica Forestale dell' Università di Firenze.] Limited distribution.

Cf. *For. Abstr.* 14 (No. 3158).

2199. Haarløv, N., and Weis-Fogh, T. **A microscopical technique for studying the undisturbed texture of soils.** *Oikos* 4 (1), 1952–53 [1954?] (44–7). 8 refs. [E.e.]

A technique is described which makes it possible to sample, to embed in agar and to cut serial sections of undisturbed, wet soil. The technique allows staining of the microflora and is suited to study of soil texture with special regard to plant and animal life.

114.2. Soil Chemistry

See also Nos. 2203, 2205, 2210, 2215, 2245, 2329–30, 2609.

2200. Wilde, S. A. **Reaction of soils: facts and fallacies.** *Ecology* 35 (1), 1954 (89–92). 35 refs.

The author supports Åslander's contention that, in the presence of a sufficient supply of available nutrients, the concentration of H ions in the soil is of minor importance to the growth of plants. Examples are given of pronounced acidiphile plants (*Tsuga*, *Abies balsamea*, *Picea mariana*, sheep sorrel and Labrador tea) and basiphile plants (*Liriodendron tulipifera*, *Platanus* sp., clover and other legumes) which in suitable environments grow well on alkaline (pH 7·3–8·0) and strongly acid (pH 4·6) soils, respectively. The ecological importance of the total acidity and total alkalinity is stressed. *From author's summary.*

114.3. Soil Formation. The Soil Profile and its Development. Litter, Humus etc.

See also Nos. 2197–8, 2221, 2229, 2329, 2333, 2342, 2533

2201. ADERIHIN, P. G. Proishodit li zasolenie počv v Kamennoĭ stepi? **[Is soil salinification occurring on the Kamennaya Steppe?]** *Počvoved.* 1953 (6), (63–6). [Russ.] A.P.B.

Evidence is presented from the author's detailed but unpublished soil studies on the Kamennaya steppe in 1925–29 and from his subsequent visits up to 1949, to discredit a recent report that patches of solonets appeared under the influence of reservoirs and shelterbelts [cf. *For. Abstr.* 14 (No. 17)]. These patches are of very long standing; it is claimed that they existed before the plantations were begun, and they do not appear to have increased during the period of observation. Similar patches occur on the steppe remote from plantations.

2202. REMEZOV, N. P. O roli lesa v počvoobrazovanii. **[The rôle of the forest in soil formation.]** *Počvoved.* 1953 (12), (74–83). 18 refs. [Russ.] A.P.B.

A review, outlining in general terms the author's theory of progressive evolution of soil and vegetation since the glacial period; from the podzols of the northern coniferous forest through the sod-podzols, to the grey and dark-grey soils of the forest-steppe, the podzols being regarded as young and the latter types as older soils formed from original podzols under the influence of gradual succession from coniferous, through mixed, to broadleaved forest, accompanied by an increasing turnover of mineral and organic nutrients leading to improvement in litter and humus, soil flora and fauna, and soil microclimate. An editorial note points out the neglect, in this exposition, of climatic changes and developments in surface relief since the Ice Age.

2203. GOGOLEV, I. N. K voprosu o genezise temnocvetnyh (rendzinnyh) počv pod lesom. **[On the genesis of dark-coloured (rendzina) soils under forest.]** *Počvoved.* 1952 (3), (241–50). 12 refs. [Russ.russ.] A.P.B.

Tabulates the results of chemical, physical and mineralogical analyses of 3 soils in the instructional forest of the Lvov Agricultural Institute, all under old Beech stands, and derived from limestone or its weathering products: (1) rendzina on the summit plateau; (2) a somewhat podzolized variant on the flanks of the plateau; (3) a heavily leached, podzolized light-grey forest soil in a col, developed from limestone weathering products. Humus content, pH and exchangeable bases all decrease in the order (1)–(3). Analyses of Beech leaf litter showed total ash and exchangeable-base contents decreasing in the same order, though the total and alcohol/benzene extractible organic matter showed no significant variation. From a few experiments to determine the relative production of NO_3 and NH_3 (taken as indexes respectively of bacterial and fungal decomposition) in soils, Beech litter, and soil treated with litter extracts, it is inferred that the relative numbers of bacteria and fungi engaged in litter decomposition are the same, whether the litter is rich or poor in bases. Nevertheless, the higher the ash content, the higher the production of both NO_3 and NH_3, i.e. the higher the rate of decomposition. It is suggested that the high base content of Beech litter on the most calcareous soils neutralizes all of the crenic acids produced in the litter, so that the soil immediately beneath it receives crenates whose presence favours the development of an abundant bacterial flora, which in turn breaks them down to the humus substance responsible for the typical dark colouring of the rendzina soils.

2204. DUCHAUFOUR, P. Modifications apportées au sol par le reboisement à l'aide d'espèces étrangères à la station (exemples pris en climat atlantique). **[Modifications to the soil by afforestation with species not indigenous to the site (examples from an Atlantic climate).]** *Rev. for. franç.* 6 (2), 1954 (73–84). [F.]

Discusses generally the effect of forests and of different species in maintaining or reconstituting brown forest soils and gives some examples of improvement of soils by planting deciduous or mixed species and of degradation of soils under pure conifers.

2205. PAVARI, A., BAGNARESI, U., CECCONI, C. A., and FLORENZANO, G. Recherches sur l'influence de *Abies alba* Mill. et *Pseudotsuga douglasii* Carr. sur les propriétés du sol forestier. **[The influence of *A. alba* and *P. taxifolia* on the properties of forest soil.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome*, 1953 Section 21 (No. 11), 1953. pp. 18 + 3 gphs. 9 refs. [F.f.g.e.] Limited distribution.

Measurements in stands of *P. taxifolia* (27 years old) or *A. alba* (26 and 33 years) showed litter depths of 2·5–3 cm. for the former and of 1–1·5 cm. for the latter with average weights of 1·796 and 2·468 kg./sq.m. respectively, the longer, finer needles of *P. taxifolia* occupying relatively more space. There was considerable variety in the soil composition within the stands and consequently a wide variation in soil permeability, but the soil under *P. taxifolia* was generally more permeable, particularly in comparison with the younger stand of *A. alba*. An examination of pH, the C/N ratio, total and soluble proteins, exchangeable Ca, hemicelluloses, cellulose and lignin in the soils, shows only negligible differences between the 2 species; none were found in microbiological properties and biochemical processes.

2206. GALOUX, A. Les essences forestières et l'évolution secondaire des sols. **[Forest species and the secondary evolution of soils.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome 1953* Section 21 (No. 9), 1953. pp. 10 + 1 dgm. [F.] [Station de Recherches des Eaux et Forêts, Groenendaal, Belgium.] Limited distribution.

Discusses soil development and populations of soil fauna under various natural forest types, and under monocultures of conifers or Beech, and a mixture of *Quercus borealis* and *Prunus serotina*.

2207. SANDRI, G. I terreni del bosco di Mesola. **[The soils of the Bosco di Mesola near Ferrara.]** *Ital. for. mont.* 8 (6), 1953 (293–8). 7 refs. [It.it.f.]

A pedological and chemical study of soils in an ancient *Quercus ilex* wood which was much depleted during the war. Leaching of carbonates from the eluvial horizon and some migration of sesquioxides to the lower horizons were observed.

2208. PAULSEN, H. A., JR. **A comparison of surface soil properties under Mesquite and perennial grass.** *Ecology* 34 (4), 1953 (727–32). 11 refs.

Surface soils of grassland recently invaded by *Prosopis juliflora* showed considerable deterioration in texture, pore space, structure, and moisture capacity.

2209. NYE, P. H. **Some soil-forming processes in the humid tropics. I. A field study of a catena in the West African forest.** *J. Soil Sci.* 5 (1), 1954 (7–21 + 3 plates). 13 refs.

A field study of the formation of a typical catena developed over banded biotite gneiss in the forest region of West Africa. The paper is a background to detailed laboratory and supplementary field studies to be described later.

2210. BARTHOLOMEW, W. V., MEYER, J., and LAUDELOUT, H. **Mineral nutrient immobilisation under forest and grass fallow in the Yangambi (Belgian Congo) region: with some preliminary results on the decomposition of plant material on the forest floor.** *Publ. Inst. nat. Étude agron. Congo belge* (*Sér. sci.*) No. 57, 1953. pp. 27. 5 refs. [E.] Price *Fr.*30.

[Cf. *For. Abstr.* 14 (No. 946).] On the acid sandy soils of this region the forest immobilizes a large % of the plant nutrients, maintaining a balance, by decomposition, circulating through the soil, which is kept exceptionally low in nutrient status. Clearing results in large releases of mineral nutrients and in accelerated losses of N, especially after burning. High losses are likely before a crop is large enough to re-immobilize these substances, even when the crop is established concurrently with the decomposition of the forest residues. Productivity declines later and the loss of nutrients may be the most important cause, though deterioration of tilth probably contributes. The object of this study was to discover whether the locally recommended forest fallow of 15 years is unnecessarily long and whether a shorter grass fallow could be substituted. The forest contains *Gilbertiodendron*- and *Scorodophloeus*-dominated types but abandoned clearings revert to almost pure *Musanga cecropioides*, which holds the ground for at least 15 years.

Native cultivators take maize and rice crops and plant bananas and cassava all in the first year, the last two remaining on the ground for 2 years during which the forest succession is again initiated. Tables show: the total dry weight and the nutrient immobilization in N, P, S, K, and Ca + Mg in kg./ha. for forest fallows of 2, 5, 8, and 18 years and for three species of grass in fallows of 3 years; the contributions of nutrients by leaves, roots, wood, dead wood and litter etc. at each stage; the march of nutrient uptake by plant parts and by total nutrients; a comparison of the nutrient uptake of forest and grass fallows; and a comparison of the available nutrients in forest and cropped soils with those immobilized in 8- and 18-year fallows. The total dry weights of the forest fallows in metric tons/ha. at 2, 5, 8 and 18 years were 20, 112, 152 and 175 respectively. Leaf production culminates early, while at 5 years 75% of the root production and over 50% of the nutrient immobilization of the 18-year fallow is already attained. The general conclusion is that for short fallows, grass appears equal to or superior to forest in this immobilization.

A second study attempted to evaluate the rate of nutrient release in decomposition. One year's measurement has shown that in mature forest and in an 8-year fallow 12,300 and 14,200 kg./ha/year respectively are returned in leaf-fall to the forest floor. Experimental substrates of leaves of *Gilbertiodendron dewevrei*, *Panicum maximum*, *Scorodophloeus zenkeri*, *Anonidium mannii*, *Musanga cecropioides* and a composite forest-leaf mixture were laid out on the forest floor and examined by sample at intervals of 0, 4, 10, 20 and 35 weeks. A table illustrates the march of decomposition by weights of nutrient elements. Highest losses of N were from leaves with initially high contents; *Musanga* and *Gilbertiodendron* lost little or none. Almost all K was rapidly lost. Counts of bacteria and fungi showed no correlation with rate of decay.

Burning releases nutrients immediately, N being almost totally lost into the air, and the bases and P deposited as oxides. In unburnt fallow, microbial action involves a re-immobilization of nutrients required for the synthesis of the microbe cell; these requirements are tabulated with those of crops, forest plant materials and fungi for comparison. It is concluded that N is unlikely to be rapidly liberated in the initial stages of the decomposition of unburnt fallow and that other nutrients are also held but to a lesser extent. It is doubtful whether in 4–6 months more than 30–50% of the K, Ca and Mg or 15–30% of the P would be liberated or of N even as much.

2211. DAUBENMIRE, E. **Nutrient content of leaf litter of trees in the Northern Rocky Mountains.** *Ecology* 34 (4), 1953 (786–93). 16 refs.

Freshly fallen leaves of 12 species of tree native to the area were analysed for N, P, K, and Ca content. *Populus tremuloides*, the only broadleaved species studied, produced litter superior in nutrient content to any of the conifers. The high Ca content of *Thuja plicata* foliage may explain in part the regular increase in soil pH that is associated with this species, but the even higher Ca content of *Abies grandis* does not alleviate acidity in the *Abies*/*Pachistima* association, showing that Ca content is not a decisive factor. Nutrient content is not related to site index for *Pinus ponderosa*, nor to the forest site types in the area, with one exception—there is limited but consistent evidence that the very acid soils of high mountain summits supporting *Xerophyllum* and *Menziesia* unions are correlated with reduced Ca content of those trees that extend up to such summits. *From author's summary.*

2212. OVINGTON, J. D. **Studies of the development of woodland conditions under different trees. II. The forest floor.** *J. Ecol.* 42 (1), 1954 (71–80). 11 refs.

A comparison has been made of the forest floor formed in three sets of experimental forestry plots

located on widely different sites. The type of forest floor developed under the same tree species is similar on all sites, and differences between the forest floors of the various plots, are largely determined by the tree species which have been established. Under the stands of conifers a thick layer of mor humus has been built up but in the hardwood plots the mull humus is thin and mixed with the upper mineral soil. Two main types of humus are recognized; in plots of Pine and Spruce the F horizon is the major component of the surface organic matter, whilst in the plots of Douglas Fir the F horizon is poorly developed and the amorphous H horizon forms the thickest horizon. The forest floors differ considerably in their pH and contents of C, N and non-volatile matter. In general, the forest floor which is formed under conifers is more acid and has a higher % C but a lower % N and ash content than that under the hardwoods. The litter fall of the conifers is more resistant to decomposition than that of the hardwoods so that a greater weight of organic material is accumulated and this contains a greater total weight of C, N and non-volatile material than the hardwood mull. [Cf. *For. Abstr.* 14 (No. 2008).] *Author's summary.*

2213. STOATE, T. N. **Soil and litter studies.** *Rep. For. Dep. W. Aust. 1952/53*, 1953 (14).

More than 2 tons of litter/acre were found to fall annually under Jarrah (*Eucalyptus marginata*) forest. Constituents included Ca 33 lb., K 10 lb., N 18·4 lb., Mg 11·6 lb., P 1 lb.

2214. POZDNJAKOV, L. K. O nakoplenii lesnoĭ podstilki v sosnovyh lesah. [**The accumulation of litter in Pine forests.**] *Dokl. Akad. Nauk SSSR* 93 (6), 1953 (1111–3). [Russ.] A.P.B.

Indicates very briefly some results of studies in the Olekma river basin in various types of Pine [*Pinus sylvestris*?] forest, tabulating for these the oven-dry total litter weight/ha. and also their composition, mean age, site quality, mean height and diam., number of trees/ha., total b.a./ha. and estimated fresh crown weight/ha. Total litter weight, which varied from 11 to 22 metric tons/ha., showed no clear correlation with age, site quality, forest type or stand composition. Correlation with b.a., however, was rectilinear and is expressed by the equation $y = 0{\cdot}35\,x + 8{\cdot}09$ (correlation coefficient $0{\cdot}823 \pm 0{\cdot}115$), where y = litter weight and x = b.a., per ha. There was also a curvilinear correlation with fresh crown weight/ha. Both relationships are shown in a graph. The ratio litter-weight/b.a. tended to decrease with increasing age of stand, but the data were insufficient for numerical evaluation of this relationship. The annual needle fall is estimated at 0·7–0·9 ton/ha. (o.d. weight); that of litter of all kinds is probably ca. 1·5 tons/ha.

114.4. Soil Classification. Soil Types

See also Nos. 2191, 2201–3, 2209, 2221, 2368, 2481–3, 3144.

2215. BLOOMFIELD, C. **A study of podzolization. III. The mobilization of iron and aluminium by Rimu (*Dacrydium cupressinum*). IV. The mobilization of iron and aluminium by picked and fallen Larch needles. V. The mobilization of iron and aluminium by Aspen and Ash leaves.** *J. Soil Sci.* 5 (1), 1954 (39–56). 14 refs. [Rothamsted Experimental Station, Harpenden.]

[Cf. *For. Abstr.* 14 (Nos. 2985–6).]

(III) The action of aqueous extracts of Rimu litter on hydrous ferric and Al oxides closely resembles that of Scots Pine and Kauri. The oxides are dissolved with the formation of organic complexes, the ferric iron being reduced even in the presence of atmospheric O.

(IV) Because of the difficulty in obtaining adequate samples of freshly fallen conifer litter, and because it was not known how much the properties of the foliage change before it is shed, a comparison was made of the properties of picked and fallen Larch needles. Water extracts of the Larch needles showed the same ability to dissolve ferric and Al hydrous oxides as extracts of non-deciduous conifers. The only differences between the picked and fallen needles were quantitative.

(V) Aqueous extracts of Aspen and Ash leaves react with ferric and Al oxides to form soluble metal-organic complexes. Reduction of the ferric Fe takes place under aerobic conditions. In contrast to the conifers, Aspen retains its activity almost unimpaired at high pH values. This explains the development of a strong A_2 horizon in certain neutral or only slightly acid soils. The relatively high water-soluble Ca present in fallen Aspen leaves is presumably responsible for the high pH and % base saturation of the grey wooded soils.

2216. FRIDLAND, V. M. Burye lesnye počvy Kavkaza. [**The brown forest soils of Caucasia.**] *Počvoved.* 1953 (12), (28–44). 43 refs. [Russ.] A.P.B.

Chiefly concerned with the classification of these types in the region—where they are montane soils—with a review of selected literature on brown forest soils in general and tabulated data on the mechanical and chemical composition of profiles in the Caucasus, and a diagram illustrating their systematic affinities.

2217. ROĬČENKO, G. I. Koričnevye počvy severnogo sklona Turkestanskogo hrebta (v predeljah Kirgizii). [**The 'cinnamon-brown soils' of the northern slopes of the Turkestan [Alai] range (Kirgizia).**] *Počvoved.* 1953 (5), (14–23). 8 refs. [Russ.russ.] A.P.B.

The author agrees with Antipov-Karataev [cf. *For. Abstr.* 11 (No. 849)] and others in maintaining these soils as a distinct type of widespread occurrence in central Asia, and describes examples from the northern slopes of the mountains in the Pamir-Alai system forming the S.W. border of the Fergana basin. Three sub-types are recognized: (1) cinnamon-brown carbonate soils of the *Agropyron*/shrub steppe at 1700–2000(–2200) m.; (2) typical cinnamon-brown soils of the *Festuca*/shrub meadow-steppe, and (3) dark cinnamon-brown leached soils of the open Juniper woodlands, both at 2000(2200)–3000 m.; above these lie (4) meadow-steppe cinnamon-brown leached soils of the sub-alpine zone at 3000–3600 m., which properly belong to another soil type (montane meadow soils). Subtypes (2) and (3) alternate patchwise: (3), though leached, has

pH values that are neutral or almost so, and is not podzolized, it has a high humus content (12–13% in the upper horizons) and relatively highly water-stable aggregates, being the least erodible of this group of soils. The Juniper woodlands and soils of subtype (3) are of great significance for erosion control and water supply in this dry region, and the importance is urged of measures not only to regenerate and safeguard them from further destruction but also to extend them so as to modify the microclimate of the intervening areas where the steppe might be converted to moister, meadow types of grassland [cf. *For. Abstr.* 13 (No. 1086)]. Physical and chemical properties of (1)–(3) are given in 8 tables.

2218. Sugrobov, M. M. Počvenno-lesorastitel'nye uslovija severnogo učastka trassy gosudarstvennoĭ zaščitnoĭ lesnoĭ polosy Stalingrad-Čerkassk. **[Soil conditions for tree growth in the northern section of the projected Stalingrad-Cherkessk shelterbelt.]** *Počvoved.* 1952 (3), (231–40). [Russ.] A.P.B.

Tabulates chemical and morphological characters of the soils (chestnut, solonets and meadow-chestnut soils) of the region, with an estimate of their suitability for tree growth. About 40% of the area is unsuitable unless radically improved.

2219. Burnotte, J. L. Les sols du Kivu. I. Les sols de cendrées volcaniques. **[The soils of Kivu. I. The volcanic ash soils.]** [*Publ.*] *Com. nat. Kivu* (*n.s.*) No. 3, 1952. pp. 69. 10 refs. [F.]

These soils cover about 100,000 ha. in the N.W. quadrant of Lake Kivu. They are classified according to climatic soil types (*Klimabodentypen*) with full pedological data and 38 profiles, 7 of which are from *Arundinaria alpina* forest.

2220. Burnotte, J. L. and Vaessen, W. Les sols du Kivu. II. La carte des sols de la vallée de la Kilombwe. **[The soils of Kivu. II. Soil map of the Kilombwe valley.]** [*Publ.*] *Com. nat. Kivu* (*n.s.*) No. 6, 1953. pp. 55. [F.f.]

Presents in this first 2000-ha. sample of a 50,000-ha. papyrus marsh, a pedological survey and a 1/10,000 soil map. The 20 soil series, comprising well-, ill-, and undrained soils, the last including a floating soil, are described in detail. A key linking particle-size distribution to a letter/number coding is given.

114.5. Soil Fertility. Soil Toxicity. Soil Depletion and Exhaustion

See also Nos. 2204, 2210, 2222, 2387, 2748.

2221. Jahn, E., and Schimitschek, G. Auswirkungen der Waldrodungen zum Zwecke der Weide- und Almmahd auf die Böden und ihr Tierleben. **[Effects of clearing forest for pasture or hay meadows upon the soil and its fauna.]** *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (112–46). 13 refs. [G.g.]

Gives the results of investigations in 1948 and 1950 on two soil types—limestone brown earths and rendzinas—in the Lechtal, Austrian Tirol. Samples were taken for quantitative study of the soil fauna; in addition, certain physical properties of the soils were determined, and samples were examined under the microscope to estimate the form, degree of decomposition and quantity of humus present and the degree of biological activity. In all, 11 sample points were selected, representing Norway Spruce forest, a Larch clump, and pasture and hay meadows both on the mountain slopes and in the valley. In all cases the soils converted to grassland showed decreases in surface and incorporated (mull) humus and lower biological activity. In the most extreme cases (pasture) there was no surface humus and very little of the mull humus/clay complexes. The soil structure had also deteriorated, decrease of the pores —especially the air-filled capillaries—being particularly noticeable. The soil fauna had decreased greatly in both species and numbers, especially the Oribatidae, which are the most important humus-producers in the soil fauna. The grazed pastures showed the worst effects, since compaction was aggravated on the heavier soils, and erosion on the lighter ones. The hay meadows (which receive artificial fertilizers) were somewhat better, though far inferior to the forest soils in organic matter, structure and animal populations. Brown earths were the more liable to compaction, but while the rendzinas retained their crumb structure even under pasture, they are more liable to erosion and karst formation. On steep slopes, especially near the timberline, clear felling and cattle grazing have created conditions favouring torrent damage and avalanches.

114.6. Soil Biology

See also Nos. 2197, 2199, 2203, 2205–6, 2210, 2221, 2245.

2222. Ambrož, Z. Mikrobiologická charakteristika některých stanovištních typů pralesovitého útvaru Mjonší v Jablunkových horách. **[The microbiological characteristics of certain site types of the Mjonší virgin forest reserve, Jablunka Mts.]** *Sborn. čsl. Akad. zeměd.* (*Ser. A*) 26 (6), 1953 (515–24). 23 refs. [Cz.russ.] A.P.B.

Gives the results of microbiological and biochemical analyses of brown forest soils from 3 plots in the Mjonší forest reserve, Western Beskid Mts., at ca. 850 m. alt., in the *Fageta-abietosa* region: (1) Under Beech/Maple/Silver Fir; ground vegetation of the *Petasites* [*albus*?] association. (2) Under the same dominants but higher up the slope and with rather drier soil; ground vegetation of the same association, but here with *Pulmonaria* outnumbering *Petasites*. (3) Under much younger [± pure?] Beech; ground vegetation scantier, of the *Dentaria* (*bulbifera*) association. Samples were taken for analysis on 29 May 1953.

For all criteria of biological activity these plots ranked in the descending order (1), (3), (2). Supplies of NH_3–N and NO_3–N in the soil were roughly equal except in (2), where the former exceeded the latter. The decreasing biological activity, in the order given, was reflected in corresponding decreases of (*a*) the ratio of spore-bearing/non-spore-bearing bacteria; (*b*) that of bacteria using NH_3– and NO_3–N to those using organic N; (*c*) nitrification and ammonification, and total soil N; (*d*) turnover of C as evidenced by decomposition of cellulose, pectin, lignin and humates. The ratio of mould fungi/total bacteria, however, increased in the same order.

2223. THORNTON, H. G. **Some problems represented by the microbiology of arid soils.** In *Desert Research*, Research Council of Israel, Jerusalem. 1952. pp. 295–301. 25 refs.

2224. RYBALKINA, A. V., and KONONENKO, E. V. Mikrobnye associacii južnogo černozema v uslovijah stepnoĭ i drevesnoĭ rastiteljnosti. [**Microbial associations of a southern chernozem under steppe and woody vegetation.**] *Počvoved.* 1953 (6), (11–22 + 2 plates). 3 refs. [Russ.russ.] A.P.B.

Reports on studies made in 1951–52 on the Khoper/Medveditsa watershed, in Stalingrad Province, of the soil microflora (1) in the middle of a wood (30- to 35-year-old Oak/Maple coppice from a plantation originally formed ca. 50 years ago); (2) at the edge of the wood, in the zone receiving additional moisture from snowdrifts, under Oak/Lime; and (3) on old fallow land near by, re-invaded by steppe vegetation. In June and Sept. 1951, counts were made of the organisms developing on various nutrient cultures 'sown' with samples of these soils. Results are tabulated for the groups—bacteria developing on meat/peptone agar, spore-forming bacteria, anaerobic N-fixing bacteria, fungi, and actinomycetes—at various depths (down to 300 cm.) in the soil. Tests [not detailed] were also made on rate of aerobic cellulose decomposition in each of the soils. The main conclusions of these analyses were that; (*a*) profiles (1) and (2) show two maxima for bacteria developing on meat/peptone agar, one at a depth of 5–30 cm. and a second at 300 cm. from the soil surface; whereas (3) showed a sharp decrease to a more or less constant minimum below 50–55 cm. depth; (*b*) cellulose decomposition was more rapid in (3) and was caused chiefly by bacteria of the *Cytophaga hutchinsonii* type. In late May and early July 1952, studies were made with a modification of N. G. Holodnyĭ's 'soil-slide' method [*Arch. Mikrobiol.* 1, 1930]; as in the original method, glass slides were inserted in the soil and subsequently withdrawn for microscopic examination of the flora growing on them, but the slides were thinly coated with sterile nutrient/agar media, since trials with 'bare slides' in 1951 had shown that at soil moistures near the wilting coefficient no organisms grew upon them. These 'agarized' slides reveal the microbial complexes active in the soil at the period of observation, including the relative proportions of different organisms and their interrelations—e.g. phenomena of antagonism. The populations so studied proved to react rapidly, and especially in the humus horizons, to differences in the milieu, varying in one and the same profile with season, temperature and moisture. In May, differences between the different sites were unimportant. In July they were more pronounced: (1) and (2) were dominated by fungi, actionomycetes and non-spore-forming bacteria, with a preponderance of mycelial forms in the upper humus horizons; below this level a great diversity of forms was found, with different dominants in the different horizons. It was not possible, however, to demonstrate specific microbial associations for plantation and steppe, either because the plantation was not old enough to have sufficiently modified the environment in this locality, or else because such specificity may be expressed by differences of the relative representation of individual groups of organisms within the associations, rather than by the presence or absence of particular groups.

2225. MITROFANOVA, N. S. Izmenenie mikroflory počv stepeĭ pod vlijaniem lesoposadok. [**Change in the steppe soil microflora under the influence of tree plantations.**] *Mikrobiologija, Moskva* 22 (3), 1953 (275–80). 8 refs. [Russ.russ.] L.S.

Gives a brief account of studies made in 1950 at an experimental station in Akmolinsk district, Kazakhstan, of the microflora of a heavy carbonate chernozem, poor in humus, under (*a*) steppe vegetation, and (*b*) a 13-year-old belt of planted *Caragana arborescens* and *Acer negundo* with a little *Betula verrucosa* and *Lonicera* sp. Samples were taken at about mid-month in June, July and August. Tables show the population of aerobic saprophytic bacteria, fungi and actinomycetes, per g. of soil; genera of fungi and species of actinomycetes found; rate of nitrification (NO_3 accumulated in moist soil after 7 days' incubation) and rate of cellulose decomposition; all for 5 different depths in the profile. For all 3 groups of micro-organisms, populations were consistently higher and were much less affected by the drought period (July–Aug.) under (*b*) than under (*a*). All groups also showed differences of composition in the two habitats, e.g. in (*a*) only 5 genera of fungi were found (*Penicillium*, *Scopulariopsis*, *Cephalosporium*, *Fusarium* and *Alternaria*), in (*b*) these and 8 other genera occurred, the entry of *Trichoderma*, *Sclerotinia* and *Phoma*, and the greater number of *Penicillium* spp., being especially noteworthy. Nitrification was far more intense in (*b*), persisting (though reduced) in the drought period, when no nitrification was found for (*a*). Cellulose decomposition was intense for (*a*) only in June, whereas for (*b*) the peak intensity occurred in July. The spring decomposition of cellulose in (*a*) is attributed chiefly to the activities of *Celvibrio*, followed in summer by fungal decomposition. In (*b*), cellulose-destroying fungi predominate.

2226. LAWRENCE, R. F. **The biology of the cryptic fauna of forests with special reference to the indigenous forests of South Africa.** A. A. Balkema, Cape Town and Amsterdam. 1953. pp. 408. 269 refs. Price £2. 10*s*. 0*d*.

A general and very fully illustrated account of the cryptofauna dwelling under the debris of the forest floor. The South African orders (excluding the universal Protozoa) belong to the phyla Platyhelminthes, Nemathelminthes, Annelida, Mollusca, and the following classes of Arthropoda—Onychophora, Myriopoda, Crustacea, Arachnida and Insecta. Chapters cover the site factors of the South African forests; faunal genera, species, number and size; form and colour; movement; respiration; senses; weapons; reproduction and development; post-natal growth and longevity; food and economic significance; distribution in space and time and distinguishing characters. Of the 32 South African orders 23 are arthropods and these comprise ca. 90% of the individuals of the cryptofauna. The

carnivorous and plant-eating classes are about equal in number.

2227. PSCHORN-WALCHER, H. Vergleich der Bodenfauna in Mischwäldern und Fichtenmonokulturen der Nordostalpen. **[Comparison of the soil fauna in mixed forests and pure Norway Spruce plantations in the north-eastern Alps.]** *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (44–111). 46 refs. [G.g.]

A shortened version of an unpublished report on studies made in 1949–50. The 12 pairs of sites selected in mixed forest [deciduous species presumably always present, but specific composition indicated only in a few instances] and pure Spruce plantations, so far as possible adjacent, represented varied conditions of climate, geology, soil, aspect and stand age in 4 climatic zones of the N.E. Alps in Austria. Data were also obtained for a Spruce/Larch forest and a Spruce plantation in the subalpine zone. The sites and their soil fauna are briefly described, followed by species lists separately for each group of organisms recorded (nematodes, earthworms, woodlice, slugs and snails, myriapods, mites, spiders, springtails, beetles, beetle and fly larvae, and ants). In most cases these lists record merely presence or absence, but for the mites and springtails 3 degrees of abundance are recognized. Differences in soil fauna and their causes are discussed, as are also the relations of soil fauna to environmental factors and the significance of the results to silviculture.

The chief result is to show that the soil fauna is much richer in both species and numbers under mixed forest. Besides the effect of litter composition, microclimate is also a factor: mixed stands are said to have a more 'oceanic' microclimate than pure Spruce, thus enabling species to exist which need temperate and moist conditions, though, as a corollary, this type of fauna suffers more in prolonged droughts than does that under pure Spruce. In mixed forest in Attergau it was found that as the stand aged and became more open, the springtail population increased relative to that of mites. The presence of ground vegetation was not found to increase soil fauna populations.

2228. MIHELČIČ, F. Nemátodos de los suelos de humus. Contribución a conocimiento de la microfauna de los suelos de humus. **[Nematodes of humus soils. Contribution to a knowledge of the microfauna of humus soils.]** *An. Edafol. Fisiol. veg.* 12 (11), 1953 (879–905). 8 refs. [Span.span.g.] E.M.B.

Lists of and notes on species found in soil under various kinds of vegetation including Beech and conifer forests.

2229. PONOMAREVA, S. I. Vlijanie žiznedejatel'nosti doždevyh červeĭ na mineralizaciju rastiteljnyh ostatkov. **[Influence of earthworm activity upon the mineralization of plant residues.]** *Počvoved.* 1952 (8), (727–32). 6 refs. [Russ.] A.P.B.

Six 1-m. quadrats in Oak forest in Moscow Province were cleared of vegetation etc. and dug one spit deep for good aeration. In late Sept. 1948, three of them (*a*) were covered with Oak leaf litter of the year (500 g. fresh weight per plot), and the others (*b*) received a mixture of clover and cabbage leaves (1000 + 4000 g. fresh weight per plot). By 4 May 1949, (*b*) was a dark-brown, half-decomposed mass uniformly covering the soil, whereas (*a*) showed no external change in appearance; no earthworm activity was observed. By the end of that month the mass on (*b*) had completely disappeared and worm casts covered the surface; in (*a*) worms had dragged most of the leaves partially into their holes. Fresh clover leaves were put on (*b*) at 620 g./plot. A month later there was scarcely any trace of these, but on (*a*) the Oak leaves had not completely disappeared nor did so till 30 July. Leaves and worm casts were sampled from time to time for analyses (tabulated). The rapid decomposition of (*b*) is believed to be due to aerobic bacteria, as is the occurrence on the leaf samples of fine calcite crystals. Calcite was also detected in worm casts from (*b*), but neither litter nor worm casts from (*a*) showed any. The chief feature on (*a*) was the leaching of much of the Ca and Mg, the latter more rapidly, from the leaves before visible decomposition set in. Such leaching was more intense in leaves in direct contact with the soil.

116. *Hydrology. Soil and Water Conservation and Erosion*

See also Nos. 2183, 2191, 2194, 2217, 2257–60, 2484–7, 2520 *et seq.*, 3143, 3146.

2230. COLMAN, E. A. **Vegetation and watershed management: an appraisal of vegetation management in relation to water supply, flood control, and soil erosion.** Ronald Press Co., New York. 1953. pp. xv + 412 + 31 photos + 6 maps. 19 pp. of refs. Price [£2. 16*s.*]

Reviews work accomplished abroad, but deals in detail with conditions, research, and experiment in the U.S.A.

2231. WILM, H. G. **Research problems in forest and range influences in the United States.** [*Preissue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 11 (No. 6), 1953. pp. 10. 10 refs. [E.] [Forest Service, U.S. Department of Agriculture.] Limited distribution.

Discusses the historical development of the problem, the organization of research on it, the present status of knowledge especially on the effects of forest and range cover, and its present and proposed application in watershed management.

2232. WEBER, A. Feld- und Laboratoriumsforschungen über die Bodenerosion in den Wäldern und die Methoden der Erosionsverhinderung in den U.S.A. **[Field and laboratory studies of soil erosion, and methods of soil conservation in the U.S.A.]** Österreichisches Produktivitäts-Zentrum, Wien. 1953. pp. ii + 54 + 1 map. [G.g.]

A report by the leader of a European study group on a tour under the auspices of O.E.E.C. of the S.E., S. and S.W. regions of the U.S.A., in 1950. Some general conclusions are drawn as to the value of the experience gained for Austrian conditions, with suggestions on the chief points in Austrian practice that might well interest American workers if an exchange visit were arranged.

2233. Guerreiro, M. Gomes. A floresta na conservação do solo e da água. **[The forest in soil and water conservation.]** Livraria Sá da Costa, Lisbon. 1953. pp. 193. 9 pp. of refs. [Port.]

Deals with the subject under the following heads: men, forests and agriculture; the influence of forests on physical surroundings; the rôle of the forest in soil and water conservation; methods used (both in Europe and the U.S.A.) for appraising forest influences; the hydrological cycle and the forest; the influence of the forests on stream flow and erosion; the influence of agriculture on the water régime and on erosion; and the damming of rivers and inland waters.

2234. Ovington, J. D. **A comparison of rainfall in different woodlands.** *Forestry* 27 (1), 1954 (41–53 + 2 plates).

At Bedgebury the rainfall in 13 forest plots planted with different species has been compared with that in the open. In all these forest plots the trees have closed canopy within 20 years of planting and the canopies differ considerably in their structure. From 6 to 93% of the gross rainfall may be retained on the tree canopies and lost to the soil. The proportion of precipitation intercepted is greatest in light rains and least in heavy rains. During light showers considerably more moisture is retained on the conifer than on the hardwood canopies. In the heavier showers rainwater flows down the stems, but stem flow represents a small proportion of the total water reaching the forest floor. The amount of water which reaches the ground along the trunks varies with the species and the character of branching. Some raindrops penetrate directly through the canopy, but many are intercepted by the canopies and coalesce to fall as large drops on the forest floor. These large waterdrops tend to fall continuously on the same spot so that in the plantations the water is distributed unevenly. In the winter months, when the deciduous species have shed their leaves, snow penetrates more easily through their canopies than those of the evergreen conifers. *Author's summary.*

2235. Kucera, C. L. **Some relationships of evaporation rate to vapor pressure deficit and wind velocity.** *Ecology* 35 (1), 1954 (71–5). 14 refs.

The principal purpose of this study was to evaluate the importance of vapour-pressure deficit (v.p.d.) and wind as factors in evaporation rate. Measurements were made at two adjacent stations, one (*a*) an open bluegrass field and the other (*b*) a small forest grove. It was indicated incidentally that mean evaporation rates for the morning and afternoon were respectively 42 and 60% greater for (*a*) than for (*b*); v.p.d. and air movement were also greater. Night values for all three variables were greater in (*b*) than in (*a*). *From author's summary.*

2236. Knapp, R., and Linskens, H. F. Beobachtungen über den Einfluss einiger mediterraner Pflanzengesellschaften auf Mikroklima und Bodenfeuchtigkeit. **[The influence of some Mediterranean plant communities on microclimate and soil moisture.]** *Angew. Bot.* 27 (2), 1953 (48–69). 39 refs. [G.g.] E.M.B.

The study was carried out near Bordighera (Italian Riviera) in (1) *Cistus* maquis, (2) a *Pinus pinaster* stand, (3) *Andropogon hirtus* dry grassland, (4) tomato beds, (5) a vineyard and (6) a *Ficus carica* plantation. The results, presented in graphs and tables, show the marked influence of the different types of vegetation on temperature and evaporation. In the relatively open *P. pinaster* stand, temperatures were fairly constant in contrast to (1) and (3). Differences in temperature and evaporation between the various vegetation types were more marked during the day than during the night. Soil moisture values were higher in (1) than in (2) and (3).

2237. Tomanek, J. Badania nad przebiegiem temperatury gruntu i parowania w różnych biotopach leśnych Białowieskiego i Wielkopolskiego Parku Narodowego. **[Studies of soil temperature and evaporation variations in different forest biotopes of the National Parks of Wielkopolska and Białowieża.]** *Prace Inst. Bad. Leśn.* No. 92, 1953. pp. 71 + 7 tbls. 25 refs. [Pol.russ.e.]

During the microclimatic studies described, measurements were made in 10 forest biotopes of the unmanaged Białowieża forest and in one mixed forest biotope of the managed Ludwikowo forest. Soil temperatures were measured at depths of 5, 10, 20, and 50 cm., evaporation at heights of 5, 50, 100, 200 cm. and more. It was found that soil temperature variations depended on both soil properties and the composition and structure of the phytocenosis. The average annual temperatures are at all levels lower under forest than under unwooded land. Coniferous biotopes showed, as a rule, higher monthly evaporation than broadleaved biotopes. During the growth period the amount of evaporation is roughly the same for the different biotopes. Evaporation increases with height above ground level, both in forested and in non-forested areas. The data are set out in numerous tables. [Cf. *For. Abstr.* 15 (No. 2193).]

2238. Ivanov, L. A. Gidrologičeskoe značenie rashodovanija vlagi lesom v različnyh zonah Evropeĭskoĭ časti SSSR. **[The hydrological significance of water consumption by forest in different zones of Russia-in-Europe.]** *Dokl. Akad. Nauk SSSR* 90 (4), 1953 (673–6). 7 refs. [Russ.russ.] A.P.B.

A review, attempting a rough comparison of (*a*) total evaporation plus transpiration for non-forest land, as calculated by Russian hydrologists from precipitation minus run-off, and (*b*) total water consumption of forests, based on the author's and other Russian papers, for selected stations in the various vegetation zones. Concludes from the various estimates (tabulated) that in the steppe and forest-steppe zones, forest consumes respectively 20–30 and 8–10% less water than grassland plus crops. In the forest zones, where an excess of water is available, the estimates for (*b*) exceed those for (*a*) by 7–16% in the mixed coniferous/deciduous and 38–61% in the coniferous forest zone. Here the forest—especially Spruce—plays an important part in preventing waterlogging and consequent bog formation. [Cf. *For. Abstr.* 14 (No. 3006).]

2239. Hori, T. [Editor]. **Studies on fogs in relation to fog-preventing forest**. Foreign Books Dept., Tanne Trading Co. Ltd., Sapporo, Hokkaido. 1953. pp. vi + 399 + 10 plates. 112 refs. [E.] [Institute of Low Temperature Science, Hokkaido University.] Price £2. 18*s*.

Districts on the S.E. sea coast of Hokkaido are often shrouded in sea fogs in spring and winter. In the hope of giving protection from fog, a wide belt of forest, the 'fog-preventing forest zone', was until recently preserved along the coast. Pressure of population is now leading to the destruction of this protective forest, and the studies reported in this book were made with a view to determining the minimum amount and optimum arrangement of forest shelter for this purpose. Research is still in the preliminary stages, but the following facts have been established. (1) The forests investigated (mixed coniferous stands 10–14 m. high and mixed hardwoods 10–15 m. high in the interior but decreasing gradually towards the sea) captured on an average 0·5 litres of fog-water/hour for each sq. m. of their areas when wind carrying 800 mg. fog water/cu.m. was blowing over them at 4 m./sec. In similar conditions, grassland captured not more than $\frac{1}{6}$ to $\frac{1}{10}$ of this amount. (2) The fog water captured by the windward edge of the forest was about equal in amount to that captured by the top surface of a forest of the same frontage whose depth was about 3 times as great as the mean stand height. In other words, the vertical edge of the forest is three times as efficient for this purpose as its surface.

Of the 25 papers composing the book, many are devoted to the technique of investigating and measuring fog, wind, atmospheric turbulence and moisture content. The following are of more definitely forest interest. General survey of the studies on fog-preventing forest (*Z. Yosida*; pp. 1–24). A theoretical study on the changes of liquid water contents of intruding stationary sea fogs due to the capturing action of a forest in the coastal region (*T. Fukutomi*; pp. 81–104). A theoretical study on the distribution of fog density in a forest (*Z. Yosida*; pp. 105–12). On the diffusion by turbulent motion near a forest and its effect upon the capture of fogs by the forest (*J. Hori*; pp. 113–35). Distribution of fog water contents in the surroundings of a forest (*T. Huzioka*, *T. Tabata* and *N. Matsumura*; pp. 205–20). On the capture of fog particles by a forest (*H. Oura*; pp. 239–60). Wind force on a conifer tree and the quantity of fog water thereby captured (*Z. Yosida* and *D. Kuroiwa*; pp. 261–78). The turbulent diffusion of fog water near the ground and the fog-preventing effect of an artificial model forest (*D. Kuroiwa*; pp. 279–302). [Cf. *For. Abstr.* 15 (No. 1371).]

14. SYSTEMATIC ZOOLOGY

See also Nos. 2648 *et seq.*

145.7. Insecta. Entomology

See also Nos. 2648–9, 2659 *et seq.*, 3007–11.

2240. Roonwal, M. L., *et al.* **A systematic catalogue of the main identified entomological collection at the Forest Research Institute, Dehra Dun. Parts 9–21. Orders Isoptera, Embioptera, Psocoptera, Anoplura, Ephemeroptera, Odonata, Thysanoptera and Hemiptera**. *Indian For. Leafl.* No. 121 (Pt. 3), 1953 (39–187).

[Cf. *For. Abstr.* 13 (No. 1837).

2241. Sullivan, C. R. **Use of radioactive cobalt in tracing the movements of the White Pine weevil, *Pissodes strobi* Peck. (Coleoptera: Curculionidae)**. *Repr.* from *Canad. Ent.* 85 (8), 1953 (273–6). 2 refs. (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 72).

It was found possible to label adult weevils with Co^{60} for part of their life span, but the amount of Co used in the experiment was too great, and increased mortality during hibernation.

2242. Rawlings, G. B. **Rearing of *Sirex noctilio* and its parasite *Ibalia leucospoides***. *For. Res. Notes N.Z. For. Serv.* 1 (8), 1953 (20–34). 5 refs.

2243. Watson, N. W. **A method of rearing sawflies [*Nematus* spp.] from Willow galls**. *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (2).

2244. McDonald, S., and Brown, A. W. A. **Cytochrome oxidase and cyanide sensitivity of the Larch sawfly during metamorphosis**. *83rd Rep. ent. Soc. Ont. 1952*, 1953 (30–4). 7 refs. I.I.E.

The experiments reported show that *Pristiphora erichsonii* in the diapause stage does not undergo a significant decrease in cytochrome oxidase content. The O consumption of diapause eonymphs is not significantly less sensitive to $Ca(CN)_2$ poisoning than that of post-diapause pupae. Comparatively high levels of $Ca(CN)_2$ are required to inhibit the respiration of the intact individuals of both stages.

15. ANIMAL ECOLOGY. GAME AND FISH MANAGEMENT, HUNTING, SHOOTING AND FISHING

See also Nos. 2190, 2651–2, 2655, 2657–8, 2661–2, 2691, 2703, 2711, 3130, 3132.

2245. Voronov, N. P. Iz nabljudeniĭ nad rojuščeĭ dejateljnosti mlekopitajuščih v lesu. [**Observations on the digging activities of mammals in the forest.**] *Počvoved.* 1953 (10), (74–8). 18 refs. [Russ.] A.P.B.

Brief, rather general notes, with tables showing (*a*) number of mole tunnels, mole hills and mouse holes etc. found on 100 × 1 m. plots in different forest types, (*b*) chemical analyses of soil from mole hills varying from fresh to old and ant-colonized, in different forest types, and (*c*) herbaceous species list for an old ant hill [former mole hill?] compared with a plot near by. The observations were made near Kazan, Tatar S.S.R.

2246. Davenport, L. A., Switzenberg, D. F., VanEtten, R. C., and Burnett, W. D. **A study of deeryard carrying capacity by controlled browsing**. *Trans. N. Amer. Wildlife Conf.* No. 18, 1953 (581–96). 4 refs. B.A.P.

Results of experimental browsing in fenced 1-acre plots in Upper Michigan, with some data on carrying capacity of different types of forest.

2247. Patric, E. F., and Webb, W. L. **A preliminary report on intensive beaver management.** *J. For.* 52 (1), 1954 (31–2).

Beavers favour the early seres of forest succession, now considerably reduced by fire protection and the practice of selective cutting. County-wide control by close season and by restrictions in take and trap is wasteful and should be replaced by management fostering colonies in allocated sites. The succession in marsh and bracken should be accelerated, and in the hardwoods and hardwoods/conifer sites, set back. The take should be restricted to the (migratory) yearlings, which tend to form new colonies in sites where agriculture, timber or trout are preferred. [Cf. *For. Abstr.* 14 (No. 48).]

2248. Buljan, M. Utjecaj šume na produkciju u vodama. **[Influence of forests on the [biological] productivity of land-locked waters.]** *Šum. List* 77 (9/10), 1953 (394–400). 10 refs. [Croat.]

Lakes or land-locked water surrounded by rich vegetation (forests or dense maquis) are continuously supplied with organic substances (foliage, branches, humus). Such basins are usually protected, since during the summer a strong reducing medium exists on the bottom, which liberates PO_4 and other nutrient salts from the ooze. Basins of this kind (lagoon of Venice, many Norwegian fiords; and a number of fresh-water lakes) are eutrophic, and usually abound in fish. The adverse effect of dystrophy (excess of organic matter) and of oligotrophy (lack of organic matter, e.g. as a result of excessive deforestation) is stressed. [Cf. *For. Abstr.* 14 (No. 224).]

16. GENERAL BOTANY

160. *Plant Chemistry*

See also Nos. 2210–3, 2285, 2602, 2848 *et seq.*, 2994–7, 3087 *et seq.*

2249. Korčemkin, F. I., Žerebov, L. P., and Evstigneev, B. V. O prirode nekotoryh veščestv kambialnogo soka sosny. **[The nature of some substances in the cambial sap of *Pinus sylvestris*.]** *Dokl. Akad. Nauk SSSR* 90 (3), 1953 (429–31). 3 refs. [Russ.] A.P.B.

Cambial tissue from living Pines in Moscow Province was collected at various dates in summer (1949–52), expressed and the sap boiled for 3 min., immediately after collection, to arrest enzyme action. The filtered saps (1) when examined spectrophotometrically in the ultraviolet range ($\lambda = 400$–220 mμ), all gave absorption curves closely resembling one another in their shape, which was very similar to that for coniferin. It is inferred that coniferin was present in the saps at all collection dates, and possibly also other aromatic substances. The dry-matter content of (1) was ca. 10%. To remove any aromatic compounds, the saps were filtered through activated charcoal. The absorption spectra of the filtrates (2) were all fairly similar, but quite different from those of (1) and their content of aromatic compounds must have been small or nil. Portions of both (1) and (2) were evaporated, the residues dried, and their methoxyl content determined. The residues obtained from (2) represented ca. 80% by weight and their methoxyl contents were 70–76%, of those from (1). Hence the bulk of the methoxyls belonged to non-aromatic substances. Results are shown in a table and graph. [Cf. *For. Abstr.* 11 (No. 1108).]

2250. Kano, T., and Hatano, K. **On the amino acids in the seeds of *Pinus thunbergii* at the germination stage.** *J. Jap. For. Soc.* 35 (9), 1953 (292–8). 14 refs. [E.e.jap.]

The amino acids in dormant and germinating seeds and in seedlings (represented by seeds in which nearly all the endosperm had been exhausted by the germinating embryo) were examined by paper chromatography. Altogether 16 amino acids, 1 amide and 6 unknown substances were isolated. Free amino acids were present in the dormant seeds in small quantities only, but increased during germination. The nitrogenous compounds of dormant seeds were divided into 3 fractions—methanol-soluble, KOH-soluble and KOH-insoluble. The last was absent from the seedlings.

2251. Hatano, K. **On the amino acids of coniferous seeds at the germination stage.** *Bull. Tokyo Univ. For.* No. 45, 1953 (145–54). 13 refs. [E.e.jap.]

Dormant and germinating seeds of *Cryptomeria japonica* and *Pinus densiflora* were examined by paper chromatography. About 15 amino acids were detected. The alcohol-soluble fraction of the *Pinus* seeds could be separated only after hydrolysis with HCl. During germination, free amino acids increased and those in the alcohol-insoluble residues decreased. The progress of amino-acid formation during germination is shown diagrammatically.

2252. Nakatsuka, T. **[Experiments on growth and N and P contents of Akamatsu seedlings** (2).] *J. Jap. For. Soc.* 34 (11), 1952 (362–5). [Jap.]

Results are tabulated (for leaf, stem, and root) for batches of *Pinus densiflora* seedlings (*a*) after 10 months' growth, at densities of 40, 80, 120 and 160/sq. m. for a total of 462 plants; (*b*) after 12 months, with and without manure, for a total of ca. 1900 plants; (*c*) after 8 months, with and without shade. [Cf. *For. Abstr.* 14 (No. 1932).]

2253. Carles, J. La nutrition minérale du châtaignier. **[The mineral nutrition of *Castanea sativa*.]** *Trav. Lab. for. Toulouse* 1 (5) Art. 9, 1951. pp. 5. [F.]

The author first stresses the importance of great care in distinguishing the outer bark (*a*) from the bast (*b*), and the sapwood (*c*) from heartwood (*d*) when analysing wood to determine its mineral contents. Samples taken from fruit-bearing branches of *C. sativa* growing on soils with different parent rocks—(1) calcareous, (2) granite, (3) basalt—were analysed for ash, Ca, Mg, K, P and N (data tabulated). N and K were always more abundant in (*a*) and (*c*) than in (*b*) and (*d*), and rather more abundant on (2) than on (1) or (3). Ca and Mg varied inversely to N and K but the variation of the latter had less amplitude. Ca was the most variable element, being 75 times as abundant in (*b*) (1) as in (*c*) (3). In general it was 10 times as abundant in bark as in wood. The heartwood showed far less

variation in Ca content with soil than did the bark; being 48·5% of the ash for (1), 48% for (2) and 42% for (3). This appears to be a constant for the species, irrespective of soil, and shows that, contrary to common opinion, it has a considerable Ca requirement. The Ca content of the sapwood ash, on the other hand, varies from ca. 36% on (1) to ca. 24% on (2), and only 17% on (3). The Ca content of bark is 3 times that of wood on (2), 7 times on (1) and 4 times on (3).

2254. Verona, O., and Fagioli, M. Sulla presunta azione fungicida dello juglone. [**The alleged fungicidal action of juglone.**] *Nuovo G. bot. ital.* (*n.s.*) 59 (2/4), 1952 (436–40). 3 refs. [It.it.e.] A.P.B.

Contrary to previous findings [cf. *For. Abstr.* 6 (p. 46)] the author found that juglone had only a weakly antibiotic effect on schizomycetes and none on yeasts or mycelial fungi.

161. *Physiology*

See also Nos. 2195, 2197, 2238, 2250–3, 2293, 2328, 2330, 2337, 2343, 2465, 2540, 2546, 2994–7.

2255. Kozlowski, T. T. **The status of research in tree physiology.** *J. For.* 51 (12), 1953 (909–10).

Search of the [American?] journals for 1945–52 reveals 303 studies of which 102 deal with trees of horticulture. The approximate division by subject is (%); water relations 6, growth 10·5, disease 3·3, chemical composition 24·7, anatomy 2, mineral nutrition 12, reproduction 9·5, growth regulators 7·3, environmental factors 13·5, metabolism 7·3, translocation 0·3, methods etc. 3·6.

2256. Satoo, T., and Namura, Z. [**Response of seedlings of *Pinus densiflora* to soil dryness.**] *J. Jap. For. Soc.* 35 (3), 1953 (71–3). 8 refs. [Jap.e.]

As soil moisture decreased, the rate of transpiration decreased, at first gradually and then more sharply until a nearly constant rate was reached. The sudden decrease began when the water-retaining capacity of the soil reached 8–9 atm. and the constant rate was reached at nearly 15 atm., which is nearly equivalent to the permanent wilting point. The water content of the seedlings did not decrease until the water-retaining capacity of the soil exceeded 15 atm. but then dropped suddenly to the critical moisture content, and the seedlings died. The seedlings most resistant to drought had a higher dry weight of top as compared with root, and higher absolute dry weight of both top and root. *From authors' summary.*

2257. Oppenheimer, H. R. **An experimental study on ecological relationships and water expenses of Mediterranean forest vegetation.** *Palest. J. Bot.* (*R. Ser.*) 8 (2), 1953 (103–24). 26 refs.

The study was made in the maquis of Mt. Heitary, in the Carmel area, with the object of observing the behaviour of the main species during the dry season. On 4 species (*Quercus calliprinos, Laurus nobilis, Phillyrea media* and *Pistacia palaestina*) transpiration rates of leaves were measured at frequent intervals with a torsion balance, stomatal apertures were examined and the osmotic values were gauged at the end of the dry season. Microclimatic data were also collected. The influence of the progressive drying of the rocky soil was marked in the first 2 species. In June and September transpiration dropped to very low levels, sometimes ceasing entirely through closure of the stomata, during the hot hours of the day. In *P. media* transpiration persisted at an even level throughout the dry summer, the stomata being always wide open. The vacuolar leaf sap at the end of the dry season had an extremely high osmotic potential. Transpiration of *P. palaestina* reached a fairly high level in spring and gradually decreased to a low summer level. Stomata were always slightly open. The author proposes to use the term oligohydric for the transpiration of plants such as the evergreen *Quercus, Laurus, Arbutus* and the conifers, distinguishing them from other, mainly deciduous, species, the transpiration of which is termed 'polyhydric'. The term 'isohydric' transpiration is used to indicate only slight fluctuations during the year, in contrast to the usual behaviour implying large seasonal fluctuations, which is called 'poikilohydric'. Thus, transpiration of *Q. calliprinos* and *L. nobilis* is oligo-poikilohydric, that of *P. media* oligo-isohydric and that of *P. palaestina* poly-poikilohydric. Differential exposure to solar radiation produces large differences in microclimatic conditions on northern, as compared with southern slopes, particularly in temperature and moisture of the uppermost soil layer and in evaporation.

2258. Ivanov, L. [A.], and Silina, A. [A.] **The methodology of botanical research (An actinometric method of determining the transpiration of forest).** *Transl. U.S. For. Serv.* No. 372, 1953. pp. 9. Transl. by V. P. Morse from *Bot. Ž.* 36 (5), 1951 (517–22). [Cf. *For. Abstr.* 14 (No. 67).] Limited distribution.

2259. Ivanov, L. A., Silina, A. A., Zhmur [Žmur], D. G., and Tselniker, Yu. [Celjniker, Ju. L.] **Determination of transpiration loss by a forest timberstand.** *Transl. U.S. For. Serv.* No. 373, 1953. pp. 21. Transl. by V. P. Morse from *Bot. Ž.* 36 (1), 1951 (5–20). [See *For. Abstr.* 14 (No. 66.)] Limited distribution.

2260. Ivanov, L. A., Silina, A. A., and Celjniker, Ju. L. O transpiracii polezaščitnyh porod v uslovijah Derkuljskoĭ stepi. [**Transpiration of shelterbelt species in the conditions of the Derkul' steppe.**] *Bot. Ž.* 37 (2), 1952 (113–27). 9 refs. [Russ.] C.G.B.

Results are graphed and tabulated of measurements on the transpiration of over 20 species of trees and shrubs used in shelterbelts, conducted in 1949/50 in (1) the Serebryany Bor forest division near Moscow and (2) the Derkul' steppe near Starobel'sk in E. Ukraine. The transpiration, measured in mg./g./hr., was determined by the rapid weighing method [cf. *For. Abstr.* 12 (No. 1748)]. The results obtained were average values of 100–3350 determinarions of transpiration during 3-min. periods, made at different times of day, from mid-May until 1 Sept.; the trees and shrubs were healthy, mostly 10–20 years old, and no distinction was made between shaded and unshaded leaves. Transpiration in (2) averaged

30–40% less than in (1), notwithstanding the higher temperature, illumination and wind force, and drier atmosphere in (2); Pedunculate Oak and Ash showed a reduction of as much as 60–70% in transpiration. Analysis of the dependence of transpiration upon external conditions, showed that (*a*) the correlation coefficient of transpiration and temperature was about the same in both localities for 5 species only, while for 12 species it was much lower in (2) than in (1), becoming negative in some cases; (*b*) with a 300–400% increase in solar radiation, transpiration increased by 7% (*Lonicera tatarica*) to 59% (Oak and *Caragana arborescens*); (*c*) no consistent results were obtained for the wind-velocity/transpiration relationship; (*d*) while in (1) a reduction of relative humidity (r.h.) below 50% nearly doubled the transpiration, in (2) reduction of r.h. to 30–50% caused little change in transpiration and even reduced it in some cases. Since the stomata were found to be closed in both (1) and (2) at r.h. values below 50% the difference between the transpiration rate in these two sites can be attributed only to cuticular transpiration, the dry climate of (2) being favourable to the formation of a thick cuticle, less pervious to water. It was found that, for a mixed 13-year-old stand (Oak/Ash/*Caragana*), the transpiration per ha. in (1) was 2–3 times that in (2), where ca. $\frac{1}{3}$ of the transpiration is covered by summer rainfall and $\frac{2}{3}$ by other moisture stored in the soil. [Cf. *For. Abstr.* 14 (Nos. 66–7).]

2261. Saharov, M. I. Zavisimostj temperatury stvolov sosny ot tipov lesa. [**Dependence of the stem temperature of Scots Pine upon forest types.**] *Dokl. Akad. Nauk SSSR* 85 (6), 1952 (1373–6). 9 refs. [Russ.] A.P.B.

Gives some data from the author's studies in 1939–40 of the internal stem temperatures 2 cm. deep from the cambial layer (ca. 4 cm. from the bark surface), at breast height, of Scots Pines ca. 34 cm. in d.b.h., in 3 Pine forest types on sands in the Bryansk experimental forest, with ground flora characterized by (1) lichens and mosses (stand 85 years old, canopy density 0·6; soil dry); (2) *Vaccinium vitis-idaea* (stand 100 years old, density 0·7; soil fresh); (3) *V. myrtillus* (stand 100 years old, density 0·6; with Spruce understorey of density 0·5; soil moist). The thermometers were inserted into bore-holes on the N. side of the trees, with a wool lagging round the inserted portion, except the bulb, and a 1-cm. wax seal at the bark surface, the protruding portions being covered with a cardboard sleeve that was only removed while readings were taken (at 7 a.m., 1 p.m. and 7 p.m. throughout the growing season, and irregularly in the remaining months). Results are tabulated. For the whole period (Sept.–Dec. 1939 and March–Nov. 1940) stem temperatures at 7 a.m. were always above air temperatures in (1) and (2), the greatest difference (2·3 and 1·8° C. respectively) between mean monthly stem and air temperatures at this hour occurring in Oct. In (3) the same was true from Aug.–Nov., with a maximum difference of 2·6° also in Oct., but for the remainder of the period the stems were cooler than the air. At 1 p.m., in all 3 forest types, the stems were cooler than the air in all months except December, when they were warmer; the max. differences, in May, were respectively 4·5, 4·2 and 6·1°. For some individual hot days the difference reached 10°. At 7 p.m., except in Sept.–Oct., the stems were cooler than the air. The highest mean monthly stem temperatures occurred in (1) and the lowest in (3), the max. differences between the types occurring in June. For the whole growing season the mean temperature differences were 0·9° between (1) and (2) and 1·1° between (2) and (3). The differences are attributed mainly to differences in radiation under the canopies (respectively 39, 25 and 10% of that in the open) and soil temperature. In (2), in fine July weather, the mean day temperature of a stem shaded by second-storey Spruce was lower than that of an unshaded stem by 7·9° on the S. and 2·7° on the N. side. That soil-water temperature is also important is shown by the facts that: (*a*) stem temperatures increased with height, e.g. the mean day temperature of the S. side of a Pine stem on a felled area, in fine July weather, was 5° higher at b.h. than at ground level, and that of an Oak (9 cm. d.b.h.) 2·1° higher at 1 m. than at 0·5 m. up the stem; (*b*) the stem temperature at b.h. was nearer to the soil temperature at a depth of 5 cm. than to that of the air at the 2 m. level; (*c*) bark thickness did not change significantly from the stem base to b.h.; (*d*) Pine bark is a poor heat conductor: between 10 a.m. and 2 p.m. in fine July weather, the bark temperature at 1·5 cm. from its surface, on the S. side of the trees was 0·7–0·9° lower than the air temperature.

Some notes are also included on the effect of aspect on temperatures 2 cm. inside the sapwood: the difference between N. and S. sides was greatest at 1 p.m. and least at 7 p.m.; the maximum differences were in July; for the whole growing season the mean temperatures were N., 14·7°, S., 15·4°.

2262. Kumakov, V. A. Vlijanie pozdnyh vesennih zamorozkov na rost i ustoičivostj duba i jasenja v svjazi s ih uglevodnym balansom. [**Influence of late spring frosts on the growth and hardiness of Oak and Ash in relation to their carbohydrate balance.**] *Dokl. Akad. Nauk SSSR* 89 (6), 1953 (1107–9). 6 refs. [Russ.] A.P.B.

A frost (— 1·7° C.) on 9/10 May, 1950, killed the tender new foliage of many Ash (*Fraxinus pubescens*) and Oak (*Quercus robur*) in an 8-year-old shelterbelt near Saratov. Ca. 60% of the Ash, but only 13% of the Oak lost more than half their foliage. After 5–7 days fresh foliage began to be produced. Analyses were made at various dates between 3 June 1950 and 3 July 1951, of the reserve carbohydrates in 1-year-old shoots of (*a*) damaged and (*b*) undamaged trees, and results are tabulated. For Ash, (*a*) showed much lower total carbohydrate contents and higher ratios of sugar/starch and disaccharoses/monosaccharoses, throughout the period of the analyses, than (*b*). It is believed that these differences also existed *before* the frost damage occurred. Many of the (*a*) group suffered further injury in the winter 1950–51, and were later in flushing, showed poorer growth, and had fewer and smaller leaves in 1951 than (*b*). For Oak, (*a*) showed practically the same total carbohydrate content as (*b*), but there was the same clear tendency as in Ash for relative predominance of sugars over starch and of di- over

monosaccharoses. These differences, however, tended to disappear, and the Oak recovered well, producing adequate fresh foliage and meeting the winter with satisfactory reserves. The superior ability of Oak to recover and produce fresh foliage is presumably due to the fact that it by no means exhausts its reserves during spring growth. Its behaviour as regards the relative accumulation and expenditure of reserves may well represent the evolution of a special adaptation to defoliation, since Oak is particularly liable to severe attacks by defoliating insects.

2263. Siminovitch, D., Wilson, C. M., and Briggs, D. R. **Studies in the chemistry of the living bark of the Black Locust in relation to its frost hardiness. V. Seasonal transformations and variations in the carbohydrates: starch sucrose interconversions.** *Plant Physiol.* 28 (3), 1953 (383–400). 33 refs. O.R.E.

[Cf. *For. Abstr.* 15 (No. 87).] Both sucrose and starch are depleted in living bark of *Robinia pseudoacacia* in late spring by the process of flushing. Sucrose begins to accumulate shortly after and reaches a maximum in late summer. Starch appears late in the summer and reaches a maximum in early autumn with the coming of cold weather, but sucrose is retained in high concentration throughout the winter. With the advent of warm weather in early spring and before growth begins sucrose seems to be converted into starch, but this process only takes place when the minimum daily temperature is ca. 0° C. Reducing sugars are present in low amounts throughout the year, reaching a maximum in late winter. Fructose is absent in late spring during the period of most active growth. Trees ringed in summer accumulate much more carbohydrate in the bark above the rings than is normal in unringed trees and, unlike these, carry the excess carbohydrates largely in the form of starch. With autumn low temperatures the starch in later ringed sections of these trees is readily converted to sucrose. Sections above the rings of trees ringed in winter show no signs of radial or terminal growth in spring. They do not become hydrated as do normal bark tissues at this time and their carbohydrates are not so radically depleted. The carbohydrates are retained in the form of sucrose and little or no conversion of this sucrose to starch is observed, even at the higher spring temperatures. These observations suggest that a temperature-sensitive and reversible enzymatic process operates in the bark of this tree and determines the direct conversion of sucrose to starch and possibly of starch to sucrose. The process may be dependent on the state of hydration of the cells of the bark tissue. *From authors' summary.*

2264. Glavač, M. Neki problemi fruktifikacije i C/N teorija. [**Some problems of fruit-bearing and the carbon/nitrogen ratio theory.**] *Šum. List* 77 (7/8), 1953 (323–30). 21 refs. [Croat.e.]

Discusses the C/N theory of Miller, Wright, and Curtis-Clark as applied to the fruit-bearing of forest species. According to some (including Jugoslavian) findings, dry sunny sites, with insufficient moisture, cause earlier fruit-bearing. According to the C/N theory, this should result from earlier attainment of the favourable C/N ratio, which is hardly the case here; it can only be said that, in spite of poor edaphic conditions, the favourable temperature and illumination hasten fruit-bearing. Other Jugoslavian observations (on Cypress and *Pinus halepensis* have shown that poor soil with much light and heat, causes an early culmination of height increment which can be explained by the C/N theory. Finally, accidental (fire, insects etc.) or deliberate (girdling) damage increases fruit-bearing in agreement with the theory; the effect of parasitic insects and fungi are also explicable thereby.

2265. Tisseverasinghe, K. **The concept of physiological age.** *J. Oxf. Univ. For. Soc.* (*Ser. 4*) No. 2, 1954 (9–12). 7 refs.

Reviews different theories, especially Lysenko's theory of 'phasic development' and Russian experiments on dormant buds. The author's own attempt to discover whether the respiratory index could be used to express physiological age was inconclusive but there were indications that dormant buds were physiologically younger on this basis than terminal buds.

2266. Christensen, C. M., and Hodson, A. C. **Artificially induced senescence of forest trees.** *J. For.* 52 (2), 1954 (126–9). 9 refs.

Wounding of the bark and roots of 4 conifers and 2 hardwoods generally failed to produce senescence and it is concluded that liability to attack by fungi through wounds is generally exaggerated. Senescence was successfully induced within 8 years, by constricting with iron bands, in Pines, Spruce, Larch, Fir and, to a less degree, Poplar, Oak and Birch. All the 8 species of fungi (including the all-pervasive *Armillaria mellea*) and the 12 species of insects identified on dying trees appeared to be secondary in this exploratory study.

2267. Rennerfelt, E., and Paris, S. K. **Some physiological and ecological experiments with *Polyporus annosus* Fr.** *Oikos* 4 (1), 1952/53 [1954?] (58–76). 15 refs. [E.e.] [Forest Research Institute of Sweden.]

Fomes annosus cannot grow in a synthetic nutrient solution without vitamin B_1; with the addition of extracts of soil and litter it is possible to obtain a higher dry weight than by the addition of the optimum dose of vitamin B_1. The optimum pH for growth is between 5·1 and 5·8; there was no growth below pH 2·9 or above pH 7·0. Optimum temperature is 22° C.; the mycelium remained alive at 2° and 32°, but did not grow. Several experiments were made to determine the interaction of *F. annosus* and other organisms. In most cases *F. annosus* mycelium had no effect on other mycelia or bacteria at 22°; but at 12° it overgrew several other fungi. This is the case with, e.g. *Trichoderma viride*, which at 22° overgrows and inhibits *F. annosus*, but at 12° is overgrown by it. [Cf. *For. Abstr.* 12 (No. 1572); 15 (No. 1050).] *From authors' summary.*

2268. Lohwag, K. Zur Fruchtkörperbildung holzzerstörender höherer Pilze in Reinkultur. [**Formation of sporophores in pure cultures of higher wood-destroying fungi.**] *Repr.* from *Sydowia, Annales*

Mycologici Ser. II, Horn 6 (5/6), 1952 (323–35 + 9 photos). 76 refs. [G.e.] P.R.

Describes the author's experiments with 43 species (22 genera) which produced sporophores in pure cultures, and lists 150 spp. from literature.

164. *Morphology*

See also Nos. 2286–8.

2269. Ferré, Y. de. Morphologie des plantules de gymnospermes (Suite 1). [**The morphology of the plantules of gymnosperms (Series 1).**] *Trav. Lab. for. Toulouse* 2 (2) Art. 2, (Suite 1), 1953. pp. 12. [F.]

Notes on seedling morphology of *Abies koreana, Callitris verrucosa, Cedrus brevifolia, Cupressus atlantica, C. cashmeriana, C. lereddii, Ephedra fragilis, Juniperus chinensis, J. oxycedrus, Keteleeria evelyniana, Metasequoia glyptostroboides, Picea nigra, P. polita, Widdringtonia cupressoides, W. juniperoides* and *Welwitschia mirabilis.*

2270. Obmiński, Z. Z obserwacji i studiów nad kwitnieniem osiki. [**Observations of and studies on the flowering of Aspen.**] *Sylwan* 97 (5), 1953 (353–61). 10 refs. [Pol.]

Summarizes provisional results of observations on the morphology and anatomy of flowers of *Populus tremula.*

165. *Phylogeny, Evolution. Heredity, Genetics and Breeding, Variation*

See also Nos. 2311, 2321, 2337–8, 2820.

2271. Campo-Duplan, M. van. Recherches sur la phylogénie des Cupressacées d'après leurs grains de pollen. [**The phylogeny of the Cupressaceae as shown in their pollen grains.**] *Trav. Lab. for. Toulouse* 2 (4), Art. 3, 1953. pp. 20. 49 refs. [F.]

2272. Cookson, I. C. **The identification of the sporomorph *Phyllocladidites* with *Dacrydium* and its distribution in southern Tertiary deposits.** *Aust. J. Bot.* 1 (1), 1953 (64–70 + 27 photos). 11 refs. O.B.D.

The tertiary sporotype *Phyllocladidites* has been found to be morphologically similar to the pollen grains of the recent Tasmanian *Dacrydium franklinii.* It is suggested that, in future, pollen grains of this kind should be referred to as *Dacrydiumites.*

2273. Cookson, I. C., and Pike, K. M. **The Tertiary occurrence and distribution of *Podocarpus* (section *Dacrycarpus*) in Australia and Tasmania.** *Aust. J. Bot.* 1 (1), 1953 (71–82). 20 refs. O.B.D.

Proves the Tertiary occurrence of section *Dacrycarpus* in Australia and Tasmania. Pollen grains of the *Dacrycarpus* type have been identified in a number of deposits, and the sporotype *Dacrycarpites* has been instituted for them. *From authors' summary.*

2274. **Proceedings, Lake States Forest Genetics Conference, March 31–April 1, 1953.** *Misc. Rep. Lake St. For. Exp. Sta.* No. 22, [1953?]. pp. 83. 44 refs.

Contains a large number of short papers by different authors on the following subjects: (1) Forest genetics in the Lake States, past and present—including information on research at the Lake States Forest Experiment Station, the University of Wisconsin, the University of Minnesota, Michigan State Colleges, the University of Michigan and the Nekoosa-Edwards Paper Company; (2) Forest genetics in other regions—Canada, and the N.E. states, the Southern States and the Inland N.W. region; (3) Forest genetics problems needing study—panel discussions on growing more productive and hardier trees; and (4) Planning future forest genetics research in the Lake States.

2275. Folweiler, A. D. **Forest trees improvement research.** *Sth. Lumberm.* 187 (2345), 1953 (200–2).

Discusses briefly research by the Texas Forest Service mainly on Southern Pine, with more detailed accounts of progeny trials on outstanding Pine trees, and studies on the genetics of wood density and on the development of drought-hardy strains of Loblolly Pine and of hybrids.

2276. Zak, B. **Developing littleleaf-resistant Shortleaf Pine.** *Sth. Lumberm.* 187 (2345), 1953 (147–9).

In a long-term co-operative programme (Division of Forest Pathology, Southeast Experiment Station and School of Forestry, University of Georgia) a number of vigorous trees from areas heavily attacked by littleleaf have been located and breeding experiments are in progress. Short-term laboratory tests for seedling resistance to attack by *Phytophthora cinnamomi* are described; these will be used in conjunction with longer-term field tests.

2277. Meyer. Der Bastard *Pinus strobus* × *excelsa.* [**The hybrid *P. strobus* × *excelsa.***] [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 13), 1953. pp. 2. [G.] [Universität Göttingen.] Limited distribution.

A 16-year-old hybrid from the Arboretum at Hann. Münden shows signs of hybrid vigour and of resistance to attack by *Cronartium ribicola.* A good seed yield with 82% viability was obtained from experimental crosses in 1951.

2278. Pozdnjakov, L. K. Drevovidnaja forma kedrovogo stlanca. [**A 'tree' form of *Pinus pumila* [× *P. sibirica*?].**] *Bot. Ž.* 37 (5), 1952 (688–91). 1 ref. [Russ.] C.G.B.

Tabulates the results of a stem analysis, and describes the needle, cone and seed characters of a single tree thought to be a natural hybrid between *P. sibirica* and the dwarf, shrubby *P. pumila*, found ca. 100 km. below Tommot, in the upper valley of the Aldan River. This tree had a straight stem 9·6 m. high and 15·3 cm. d.b.h. and was 136 years old.

2279. Pozdnjakov, L. K. Krupnaja forma kedrovogo stlanika. [**A large form of *Pinus pumila.***] *Priroda, Moskva* 42 (6), 1953 (113–4). [Russ.] A.P.B.

Brief notes on several 'giant' forms of *P. pumila* (up to 5 m. tall) with various crown shapes but having a general habit intermediate between shrub and tree, found in the basins of the Nimnyr rivers (tributaries of the Aldan) [cf. preceding abstract]. Forms such as these might be useful for afforesting rocky slopes in the region.

2280. KIELLANDER, C. L. Om kontinentgranen. Härdighet, rasförädling och fröförsörjning. [**'Continental' [as opposed to Swedish] Spruce. Hardiness, breeding and seed production.**] *Repr.* from *Svensk PappTidn.* 56 (23; 24), 1953 (900–19; 941–54). 89 refs. [Sw.g.] (*Medd. Fören. Växtförädl. Skogsträd* No. 56.)

Includes: a detailed survey of Swedish investigations, completed and in progress, on the frost-hardiness of 'continental' Spruce, its late start in growth in spring as compared with Swedish Spruce, and its faster rate of growth, at least in S. Sweden; discussion of the selection of trees for breeding: a survey of literature on geographical and ecological distribution of Spruce in Europe with an account of a tour in W. Germany, Switzerland, Austria, France and Belgium to select trees for propagation in Sweden; accounts of Swedish research on natural and induced polyploidy and of existing seed orchards; and a discussion on the possibility of producing and collecting enough 'continental' Spruce seed from Swedish sources to obviate the present need to import.

2281. BOUVAREL, P. Variabilité de l'épicéa ('*Picea excelsa*' Link.) dans le Jura français: répartition et caractères des divers types. [**The variability of Spruce (*Picea abies*) in the French Jura: distribution and characters of the different types.**] *Rev. for. franç.* 6 (2), 1954 (85–98 + 6 photos + 1 map). 3 refs. [F.]

Discusses variations in height and diameter growth, branch form and angle, cone colour and stem form, and describes types characteristic of different altitudes.

2282. SUSMEL, L. Polymorphisme de l'épicéa dans le Cadore orientale. [**The polymorphism of Spruce [*Picea abies*] in the eastern Cadore.**] [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 10), 1953. pp. 6 + 7 drawings. [F.] Limited distribution.

[Cf. *For. Abstr.* 15 (No. 1108).]

2283. FISCHER, F. Beobachtungen an der Nachkommenschaft einer dickrindigen (lärchenrindigen) Fichte (*Picea abies* [L.] Karst. lusus *corticata* Schr.). [**Observations on the progeny of a thick-barked Spruce—*Picea abies* lusus *corticata*.**] *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (1), 1953 (1–16 + 5 photos). 9 refs. [G.g.f.]

Gives data on two sample plots established in 1911–12 to test the progeny of an abnormal Spruce with 'Larch bark'. The abnormality did not appear in the progeny until the age of ca. 32 years. It is linked with lack of vigour and at present some 25% of trees display it, but the character was no doubt latent in a large proportion of trees that died earlier.

2284. FISCHER, F. Ergebnisse eines Versuches über die Vererbbarkeit der Wuchsform bei Lärche (*Larix decidua* Miller), mit einem Beitrag zur Methodik der Erfassung von Formmerkmalen. [**Results of an investigation on the inheritance of growth form in Larch, with a contribution on methods of assessing form characteristics.**] [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 2), 1953. pp. 5 + 1 dgm. 10 refs. [G.g.] [Eidg. Anstalt für das forstliche Versuchswesen, Zürich.] Limited distribution.

Results of measurements on 45-year-old Larch from parent trees ranging from good to very poor in stem form, show clearly that stem form is inherited. In the method used (illustrated) the inclination of the stem and the deviation from the perpendicular, independently of the tree's inclination, of different sections of the stem height are measured on 2 sides of the tree; from a sum of the results an average is obtained for each provenance, and trees may be classified into different quality classes.

2285. CHIBA, S. [**Inheritance of autumn colouring of needles in Sugi (*Cryptomeria japonica*)—I. Observations on change of colour in needles in autumn and experiment on crossing trees on which the needles change to reddish-brown and those on which they do not change colour.**] *J. Jap. For. Soc.* 35 (9), 1953 (286–9). 8 refs. [Jap.jap.e.]

The autumn change in colour in needles of *C. japonica* is associated with decrease in chlorophyll and the occurrence of pigments found to be α-carotin, β-carotin and xanthophyll, (chloroplasts). Trees with needles changing colour (red type) were crossed with those with needles remaining green (green type). It was found that F_1 progenies from red × red or red × green crosses were all of the red type. Green-type progeny only arose from green × green crosses. This suggests that the gene causing change in needle coloration is dominant and that causing retention of green coloration is recessive. The dominant gene probably causes the destruction of chlorophyll in the chloroplasts. *From author's summary.*

2286. MICHAEL, K. Vergleichende Untersuchungen über die Farbeigenschaften und den Bau der Blätter von Aurea-Varietäten verschiedener Gehölze. [**Comparative investigations on the coloration and leaf structure in *aurea* varieties of trees and shrubs.**] *Züchter* 23 (10/11), 1953 (296–317). 28 refs. [G.g.] E.M.B.

Differences are discussed in the development of leaf coloration during the growing season; in dates of leaf emergence and leaf fall and of flowering and fruiting; in leaf dimensions and anatomical structure; and in size and distribution of the chloroplasts in normal and *aurea* forms of *Corylus avellana*, *Quercus robur*, *Ulmus glabra*, *Philadelphus* spp., and *Chamaecyparis pisifera*.

2287. MCVEAN, D. N. **Regional variation of *Alnus glutinosa* (L.) Gaertn. in Britain.** *Watsonia* 3 (1), 1953 (26–32 + plate). 8 refs.

Data from 18 populations show that Alder in Britain exhibits clinal variations in some features of its morphology and physiology, and that these variations tend to take place along the main climatic gradient S.E.–N.W. The fact that no similar morphological gradients could be established altitudinally supports the theory that the differences are genotypic. [Cf. *For. Abstr.* 15 (No. 133).]

2288. VERESIN, M. M. Interesnyĭ ekzempljar duba. [**An interesting specimen of Oak.**] *Priroda, Moskva* 42 (5), 1953 (116–7). [Russ.] A.P.B.

A tree in a 12-year Oak [*Quercus robur* s.l.] plantation in Vinnitsa district, Voronezh, had lanceolate Willow-like leaves on ca. 95% of its shoots. Normal leaves occurred towards the crown apex. Some shoots had both types of leaf. The lanceolate leaves developed from winter buds; the normal, on Lammas growth. This phenomenon is ascribed to atavism, with reference to the lanceolate leaves found in subsection *Phellos* of the genus.

2289. SCHRÖCK, O. Beitrag zur Züchtung der Robinie (*Robinia pseudoacacia*). [**The breeding of *R. pseudoacacia***.] *Züchter* 23 (9), 1953 (266–72). 10 refs. [G.g.] E.M.B.

The theory that straightness of stem in *R. pseudoacacia* is inherited is confirmed by two neighbouring stands, one crooked- and one straight-stemmed, both of which have reproduced by suckers and show the stem form of the parent trees. No clear evidence of difference in growth rates was obtained from a limited number of measurements of the stems from the two stands, but there seems to be more rapid volume increment in the straight-stemmed trees. Two bark classes, one coarsely and one finely fissured, and an intermediate type, were found. The coarse-barked type showed smaller annual increment than the fine-barked type. The possibility of genetical inheritance of timber strength properties is briefly discussed.

2290. KURATA, T., and YAMADA, Y. [**Fundamental studies on Camphor-tree [*Cinnamomum camphora*] breeding (III). The seedling growth of the two varieties 'Akakusu' and 'Aokusu'.**] *J. Jap. For. Soc.* 35 (9), 1953 (298–301). 11 refs. [Jap.jap.e.]

Gives the results [in groups] of height and diameter growth measurements throughout the growing period on 1- and 2-year seedlings. *From authors' summary.*

2291. GREHN, J. Samenentwicklung und Jugendwachstum bei Kreuzungen in der Sektion *Populus Leuce*. [**Seed development and seedling growth of crosses within *Populus* section *Leuce***.] [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 3), 1953. pp. 7 + 1 photo + 2 drawings + 1 gph. 6 refs. [G.g.] Limited distribution.

Cf. *For. Abstr.* 14 (No. 995).

2292. DOOLITTLE, W. T. **Growth and survival of hybrid Poplars**. *Sth. Lumberm.* 187 (2345), 1953 (178–9).

Results of an examination of 12 hybrid Poplar clones planted in 1935 in the Coweeta Experimental Forest, N. Carolina and the Toccoa Experimental Forest, Georgia, show average survivals ranging from 7 to 76%, and heights and diameters ranging from 25 to 54 ft. and from 1·5 to 7·6 in. respectively. Conclusions are that some hybrid Poplars on good sites in the S. Appalachians grow faster than the fastest-growing native species.

2293. MARQUARDT, H. Die Entwicklung einer Methode zur züchterischen Bearbeitung von Standorteigenschaften bei der Pappel. [**The development for breeding purposes of a method of determining Poplar site relationships.**] [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 14), 1953. pp. 5. [G.] Limited distribution.

Reports briefly on experiments at the Forstbotanisches Institut der Universität Freiburg on transpiration and resistance to drought of some Poplar clones, concluding from statistical analysis of the results that these characters are inherited and that certain clones can be characterized as suitable for wet and others for dry sites.

166. *Economic Botany*

See also section 892.

2294. KROCHMAL, A., PAUR, S., and DUISBERG, P. **Useful native plants in the American Southwestern deserts**. *Econ. Bot.* 8 (1), 1954 (3–20). 52 refs.

A list of species (some woody) with notes on their uses.

168. *Histology*

See also Nos. 2811 *et seq.*

2295. ARCHIBALD, J. F. **Culture *in vitro* of cambial tissue of Cacao [*Theobroma cacao*]**. *Nature, Lond.* 173 (4399), 1954 (351–2). 3 refs. [West African Cacao Research Institute, Tafo, Gold Coast.]

17. SYSTEMATIC BOTANY

172.8. Eumycetes (True Fungi)

See Nos. 2620 *et seq.*, 2985 *et seq.*

174. *Spermatophyta, Seed-Plants in General. Floras and Check-Lists*

2296. BOR, N. L. **Manual of Indian forest botany**. Oxford University Press, Indian Branch, Bombay. 1953. pp. xvi + 441 + 31 plates. Price *Rs.*25 (£2. 2*s.*).

Essentially a forest flora with keys, covering both India and Pakistan.

2297. LI, H.-L. **Endemism in the ligneous flora of Eastern Asia**. *Proceedings of the 7th Pacific Science Congress, New Zealand, 1949* Vol. 5 (Botany), 1953. pp. 212–9. Government Printer, Wellington.

2298. GOSSWEILER, J. Nomes indígenas de plantas de Angola. [**Native names of plants of Angola.**] *Agron. angol.* No. 7, 1953. pp. 587 + 106 photos. + 1 map. [Port.]

A comprehensive and profusely illustrated work, containing: (1) a list of native names, and (2) descriptions of the species. An index to scientific names is included, also a map showing language boundaries in Angola.

2299. Flore du Congo Belge et du Ruanda-Urundi. Spermatophytes. Vol. IV. [**The flora of the Belgian Congo and of Ruanda-Urundi. Spermatophytes. Vol. IV.**] *Publ. Inst. nat. Étude agron. Congo belge* 1953. pp. [vi] + 314 + map. [F.]

Cf. *For. Abstr.* 14 (No. 1969).

2300. BURTT, B. D. **A field key to the savanna genera and species of trees, shrubs and climbing plants of Tanganyika. Part II. The species of the**

more important genera with general index. Government Printer, Dar-es-Salaam. 1953 (i–xvii + 54–128 + 25 plates). Price. 6*s*.

Issued by the E. African Tsetse Research Organization, and revised by *P. E. Glover* and *C. H. N. Jackson*. Part I was published in 1939. [Cf. *For. Abstr.* 2 (p. 198).]

2301. PARDY, A. A. **Notes on indigenous trees and shrubs of Southern Rhodesia**. *Rhod. agric. J.* 50 (4), 1953 (324–6 + 4 plates). E.M.B.

Gymnosporia senegalensis, *Acacia albida*, and *Faurea speciosa*.

2302. LITTLE, E. L., JR. **Check list of native and naturalized trees of the United States (including Alaska)**. *Agric. Handb. U.S. Dep. Agric.* No. 41, 1953. pp. 472. 52 refs. Price $2·00. I.F.B.

Supersedes G. B. Sudworth's 'Check list of the forest trees of the United States, their names and ranges', 1927, and contains information (in alphabetical order of genus and species, with derivation, common names, range and references) for 1027 species, varieties and hybrids, and 45 typical varieties, belonging to 252 genera and 77 families; and lists the more common commercial names used for lumber. There is a botanical index, arranged by the Dalla Torre and Harms numbers, plus an index of common names. This edition of the check list officially recognizes changes from the commonly used scientific names of a number of important species, e.g. Douglas Fir, Slash Pine, Red Oak, and Yellow Birch.

2303. STEYERMARK, J. A., *et al.* **Contributions to the flora of Venezuela. From Ericaceae through Compositae**. *Fieldiana* (*Bot.*) 28 (3), 1953 (449–678).

174.2. Gymnosperms

See also Nos. 2269, 2271–3, 2277–83, 2285–6, 2403.

2304. SHAW, T. E. **The Cedar of Lebanon**. *Foreign Agric.* 17 (7/8), 1953 (131–2). E.M.B.

General information and notes on regeneration experiments in Lebanon.

2305. STANEK, W. Der Lärchenwald in Finnland. [**Larch forest in Finland.**] *Holz-Zbl.* 80 (19), 1954 (216). [G.]

Describes the species and hybrids of *Larix decidua*, *L. sibirica* and *L. leptolepis* grown in Finland. [Cf. *For. Abstr.* 10 (No. 1618).]

2306. IGNACIO AGUILAR, J. Pinos de Guatemala. [**Pines of Guatemala.**] *Suppl.* to *Mensajero de Ceres*, *Guatemala* No. 1, 1953. pp. 19. 5 refs. [Span.]

Descriptions of 10 species of Pine native to Guatemala.

2307. SCHWERDTFEGER, F. Beobachtungen über die *Pinus*-Arten von Guatemala (Zentralamerika). [**The *Pinus* spp. of Guatemala.**] [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 6), 1953. pp. 5 + 2 dgms. 12 refs. [G.] Limited distribution.

Botanical and silvicultural characteristics of the 9 native species identified.

175.2. Monocotyledons

2308. HOLTTUM, R. E. **A Malayan blow-pipe Bamboo**. *Kew Bull.* 1953(4), (493–6).

A Bamboo with long internodes used for blow-pipes was identified and named *Schizostachyum jaculans* sp. nov.

176.1. Dicotyledons

See also Nos. 2286–8, 2400, 2814.

2309. GUCCI, E. Montevergine: centro di vegetazione dell'*Acer lobelii*, Ten. in provincia di Avellino. [**Montevergine: a centre of vegetation of *A. lobelii*.**] *Monti e Boschi* 5 (1), 1954 (33–6). 6 refs. [It.f.e.]

Describes the botanical characters and distribution of this species.

2310. KLAEHN, F. U., and RUNQUIST, E. Die Birke: eine Zusammenfassung der neuesten Untersuchungsergebnisse in forstbotanischer und forstbenutzlicher Hinsicht und zur waldbaulichen Behandlungsweise dieser Holzart. [**Birch: a summary of the results of recent research on its botany and utilization, with notes on its silvicultural treatment.**] *Allg. Forst- u. Jagdztg.* 123 (6), 1952 (172–7). 20 refs. [G.]

A review chiefly of selected Swedish and Finnish literature on *Betula verrucosa* and *B. pubescens* (the various 'species' segregated in this group are all taken to be variations of *B. pubescens*).

2311. KLAEHN. Über die Maserbirken und die Möglichkeit ihres Anbaues. [**Figured Birch, its possible cultivation.**] *Forst- u. Holzw.* 9*A* (2), 1954 (29–31). 7 refs. [G.]

Discusses different types of abnormal figure in Birch, their cause, and past investigations into this phenomenon, and makes some recommendations for raising stands of figured Birch. Experiments involving grafting are in progress at the Institut für Forstbotanik und Forstgenetik der Forstlichen Fakultät, Hann. Münden. [Cf. *For. Abstr.* 13 (No. 2952).]

2312. WYATT-SMITH, J. **Materials for a revision of Malayan *Durio* with notes on Bornean species**. *Kew Bull.* 1953 (4), (513–32).

2313. CUATRECASAS, J. **Novelties in the Bombacaceae**. *Phytologia* 4 (8), 1954 (465–80). A.P.B.

Descriptions of 17 new species with some new varieties and combinations.

2314. CUATRECASAS, J. **Five new species of *Brunellia*.** *Phytologia* 4 (8), 1954 (481–5). A.P.B.

2315. BATHIE, H. P. DE LA. Revision des Ébénacées de Madagascar et des Comores. [**Revision of the Ebenaceae of Madagascar and the Comoro Islands.**] *Repr.* from *Mémoires de l'Institut Scientifique de Madagascar, Tananarive* (*Sér. B*) 4 (1), 1952 (93–154 + 9 plates). [F.]

2316. FERNANDES, C. TAVEIRA. Oito anos ao serviço do castanheiro. [**Eight years in the service of Chestnut.**] *Estud. Inform. Serv. flor. aqüic. Portugal* No. 2–C7, 1953. pp. 21 + 1 tbl. 12 refs. [Port.] Limited distribution.

Summary of the work of the forest service since 1944 in reforestation, protection, selection and other aspects of research on *Castanea sativa*.

2317. POOLE, A. L. **New data concerning the distribution of *Nothofagus*.** *Proceedings of the 7th Pacific Science Congress, New Zealand, 1949*, Vol. 5 (Botany), 1953. pp. 159–64. 14 refs. Government Printer, Wellington.

Discusses the taxonomy and distribution of the genus and makes tentative suggestions for splitting it into two groups with *N. menziesii* and *N. fusca* as the respective types.

2318. RAIZADA, M. B. **The correct name of Pipli (*Bucklandia populnea* R. Br. ex Griff.).** *Indian For.* 79 (12), 1953 (673–4).

Argues that the name *B. populnea* is not valid and proposes the name *Symingtonia populnea* (R. Br. ex Griff.) Van Steenis.

2319. KOSTERMANS, A. J. G. H. **A historical survey of Lauraceae.** *Journal of Scientific Research, Djakarta* 1 (4; 5; 6/7), 1952 (83–95; 113–27; 141–59). Many refs. [E.] A.S.L.I.B.

A survey of world literature from 1700.

2320. BRENAN, J. P. M. ***Soyauxia*, a second genus of Medusandraceae.** *Kew Bull.* 1953 (4), (507–11).

Soyauxia is transferred to Medusandraceae on morphological and anatomical grounds, but chiefly on the basis of the structure of the ovary, which possesses a slender central column attached at the base and apex, a morphological feature typical of the Medusandraceae. [Cf. *For. Abstr.* 14 (No. 140).]

2321. FARVARGER, C. Recherches taxonomiques sur les Mélastomacées d'Afrique occidentale. [**Taxonomic researches on the Melastomaceae of West Africa.**] *Repr.* from *Lejeunia, Liége* 16, 1952 (1953), (53–6). [F.e.] In *Flora and Vegetation of Tropical Africa*, Papers presented at Symposium organized by A.E.T.F.A.T., Brussels, 24–27 Oct., 1951.

Cytology confirms the aberrant position of Memecyloideae and supports the primitive character of *Memecylon*. Primitive genera with little heterandry have few, and genera with strong heterandry have many chromosomes and are generally polyploid. More than half the species examined of 10 genera and 4 tribes are polyploids.

2322. BREMEKAMP, C. E. B. **Some new species of *Pavetta* L. from Tropical and South Africa: II.** *Kew Bull.* 1953 (4), (501–5).

Several new species are described, including some trees.

18. PLANT ECOLOGY

See also Nos. 2187, 2189.

181. *Mode of Life, Autecology. Silvicultural Characters of Trees*

See also Nos. 2381–2, 2797, 2800.

2323. DAKOV, M. P. Dub, jeho biologické vlastnosti a způsoby zdokonaleného pěstění. [**Oak, its biological properties and methods of improved growing.**] *Lesn. Knihovna* (*malá Řada*) No. 24, 1953. pp. 111. 151 refs. [Cz.cz.] Price *Kčs.* 7.

A translation from a Russian original published in Sofia, 1951. Includes the contents of a previous paper [see *For. Abstr.* 13 (No. 227)]. Lysenko's theory of phasic development is adhered to by the author, the two main stages in the regeneration of Oak stands being: (*a*) phase of formation of young growth (first 2–3 years), and (*b*) subsequent development. The effect of plant cover, soil moisture, atmospheric humidity, and illumination is discussed. Bulgarian experience shows that the optimum canopy density is 0·5 for stand and 0·2 for young growth, both higher and lower values being detrimental to young growth. Young Oak, when surrounded by grass shows an increment of $\frac{1}{2}$–$\frac{1}{3}$ of that surrounded by forest plants, is more sensitive to frosts and summer heat, and has yellow-green etiolated leaves.

2324. POKORNÝ, J. Ořešáky. [**Walnuts.**] *Lesn. Knihovna* (*malá Řada*). No. 18, 1952. pp. 85. 42 refs. [Cz.cz.] Price *Kčs.*27.

Describes the botanical and ecological characters of *Juglans* species, the selection of suitable species and varieties (fruit quality, frost-resistance etc.), and their cultivation both for timber and nuts. [Cf. *For. Abstr.* 15 (No. 2399).]

2325. THIRAWAT, S. **Note on *Casuarina junghuhniana* with special reference to its experimental introduction into India.** *Indian For.* 79 (12), 1953 (636–42).

Silvicultural characters, nursery practice and growth data. Propagation is vegetative, usually by air-layering.

181.1. Distribution, Natural Range

See also Nos. 2184, 2297, 2317.

2326. TURRILL, W. B. **Pioneer plant geography: the phytogeographical researches of Sir Joseph Dalton Hooker.** Martinus Nijhoff, The Hague. 1953. pp. xiii + 267 + 21 plates. 17 pp. of refs. (Vol. 4 of *Lotsya: a biological miscellany.*)

The general purpose of this book is to present concisely the major contributions of J. D. Hooker to the subject of plant distribution, with extensive quotations from his work, and to evaluate them from the subsequent work of many botanists. The bibliography of between 400 and 500 references enables further details to be traced. The book is divided into chapters on: the distribution of arctic plants; Syria and Palestine; India; Africa; North America; the Galapagos Islands; and Antarctica; with miscellaneous and general considerations, summary and conclusions.

2327. ZENARI, S. *Juniperus sabina* L. in Val di Vizze e in Val Passiria (Alto Adige). [***J. sabina* in two valleys of the Upper Adige.**] *Nuovo G. bot. ital.* (*n.s.*) 59 (2/4), 1952 (252–86 + 2 maps + 4 photos). 18 refs. [It.it.e.] A.P.B.

Records the presence of this species for the first time in the Val di Passiria, and gives a detailed account of the associated vegetation on both sites.

181.2. Atmospheric Relations. Acclimatization

See also Nos. 2262–3, 2280, 2293, 2323, 2593.

2328. Ozol, A. M., and Lazareva, A. A. Sostojanie kletok tkaneï pobegov vo vremja zimnego pokoja i zimostoïkostj orehov. [**The condition of cells in shoot tissues during winter dormancy and the winter-hardiness of *Juglans* spp.**] *Dokl. Akad. Nauk SSSR* 89 (6), 1953 (1111–4). 11 refs. [Russ.] A.P.B.

Tests made during winter 1950–51 on 1-year-old branchlets of 10-year-old *Juglans mandshurica* and *J. cinerea* (both winter-hardy), *J. cordiformis* and *J. nigra* (not very hardy), and *J. regia* (various trees differing in hardiness), grown near Moscow, showed that the cells of bark and primary wood in the hardier kinds (*a*), were less rapidly plasmolysed than those of the less hardy (*b*). In (*a*) the number of cells with a pronounced lipoid layer surrounding the protoplast was high and increased towards mid-winter; in (*b*) it was lower and more or less constant throughout dormancy. Little or no starch was present in wood and rays of (*a*), but considerable amounts in (*b*), during this period. [Cf. *For. Abstr.* 14 (No. 158).]

181.3. Water, Soil and Root Relations (including Bacterial and Mycorrhizal Symbiosis)

See also Nos. 2195, 2200, 2201 *et seq.*, 2215, 2253, 2256–7, 2335, 2344–6, 2487–8, 2718, 2755.

2329. Asahi, M. [**An edaphological study on the growth of White Pine [*P. strobus*].**] *Bull. Tokyo Univ. For.* No. 45, 1953 (103–10 + 3 photos). 11 refs. [Jap.jap.e.]

A study of the soil in White Pine plantations [in Japan] and of the effect of the degree of Ca saturation on the growth of White Pine in pots, yielded the following results: (1) The properties of the deeper layers have an important effect on tree growth. (2) Most soils, considered physically, except excessively clayey ones, are suitable for White Pine. (3) Both moisture and nutrient requirements are low; 25% Ca saturation is the optimum and 80% the upper limit for growth. (4) The humification of organic matter from needles is highest in 20- to 40-year-old stands, but it is considered that raw humus is formed and acid humus accumulated in older stands. [Results are given in a graph and tables with English legends.] *From author's summary.*

2330. Tjulin, A. F., Kušnirenko, S. V., and Ščerbina, K. G. Mineraljnoe pitanie duba i soputstvujuščeï emu rastiteljnosti na temnoseryh lesnyh počvah. [**The mineral nutrition of Oak and of associated vegetation on dark-grey forest soils.**] *Počvoved.* 1953 (3), (19–28). 10 refs. [Russ.] A.P.B.

Trials have been in progress in several Oak woods in the drier parts of Russia to determine the possibility of increasing the seed yield and frequency of seed years by mineral fertilizers, including trace elements. In one of these woods on a rich soil in the Tellerman experimental forest, Voronezh, periodical analysis of soil samples through the growing seasons of 1951 and 1952 revealed that there was a marked decline of C, N and P in June and July in the soil horizon 3–15 cm. deep—the zone of maximum rooting density. This decline occurred on both treated plots and controls, but was temporary, the contents of these elements being almost or quite restored to their original values by October. To demonstrate that the decline was due to absorption by roots, litter was removed from a plot 2 m. square, the soil was removed to 15 cm. depth and transferred, after all visible roots had been picked out, to a similar plot excavated to the same depth and provided with board sides to exclude roots. The root-free plot (kept weeded) did not show the decline in the 3 elements. The mechanism of restoration in the second half of the growing season is a matter for further research. Some analyses of fine roots suggest that not all of the quantity of N and P absorbed is translocated to the stem and crown. Further, it is estimated that e.g. the amount of N disappearing from the main rooting zone in June–July may be 15–10 times that returning to the soil via the litter. The authors confine themselves to a first hypothesis of return through the roots by exosmosis and in part by decomposition of roots. Selected data are tabulated.

Results of the fertilizer treatments [not detailed] on growth and seed production are said to be very promising. The applications per tree were 3 kg. superphosphate, 0·5 kg. each of NH_4NO_3 and KCl, and 0·5 g. each of B, Zn and Cu (all the trace elements being applied as solutions).

2331. Truszkowska, W. Mykotrofizm olesów Białowieskiego Park Narodowego i Domaszyna pod Wrocławiem. [**Mycotrophy of plant associations in the Alder forests of Białowieza National Park and at Domaszyn near Wrocław.**] *Acta Soc. Bot. Polon.* 22 (4), 1953 (737–52). 13 refs. [Pol.pol.g.] O.B.D.

Five plant associations were studied in Białowieza National Park, (1) *Alnetum glutinosae typicum*, (2) *Fraxineto-Alnetum* (according to Matuszkiewicz's classification), (3) *Alneto-piceetum* and (5) *Alneto-carpinetum* (according to Paczoski's classification). At Domaszyn only *Fraxineto-Alnetum* was present. Formation of mycorrhizae was by no means universal in these associations. In (1) 47% of plants formed mycorrhizae, in (3) 53%, in (4) 66%, in (2) 65·5–85·5%, and in Domaszyn 53%. Water is the main factor influencing mycotrophy, though humus content, insolation, and the type of association are also important. Fertile soils are occupied by autotrophic vegetation. The natural Alder forests of Białowieza form a more favourable environment for the development of mycorrhizae than managed forests of the same type.

2332. Pachlewski, R., and Gagalska, J. Badania mykotrofizmu dębów na terenie Polski z uwzględnieniem warunków bioekologicznych. [**The mycotrophy of Polish Oaks with regard to ecological conditions.**] *Acta Soc. Bot. Polon.* 23 (3), 1953 (561–76). 10 refs. [Pol.pol.g.] O.B.D.

Exclusively ectotrophic mycorrhizae were found on *Quercus robur* in Poland, their frequency of occurrence and type depending on ecological conditions,

The following types according to Melin's classification were distinguished, A, D_a and D_n, along with a type new to Oak, which is designated type E by the author. This is characterized by bristles on the fungal sheath. A detailed description is included.

2333. Matjuk, I. S. Vlijanie počvennyh uslovii na razvitie kornevyh sistem drevesnyh i kustarnikovyh porod. **[The influence of soil conditions on the development of the root system of trees and shrubs.]** *Počvoved.* 1953 (5), (24–30). [Russ.] A.P.B.

Discusses with scale diagrams accompanied by profiles showing soil texture, the development of some root systems of trees and shrubs in mixed plantations (from 14 to 40 years old) in the chestnut-earth zone of Rostov province, based on studies made in 1952. The mixtures dealt with are *Pinus sylvestris*/*Quercus robur*, *P. nigra* var. *caramanica*/*Q. robur*, and mixtures of *P. sylvestris* with one or other of the following—*Populus nigra*, *Betula verrucosa*, *Salix* sp., *Rhus cotinus*, *Caragana arborescens*. Concludes that in addition to the differences in rooting habit between species, there are marked differences in root behaviour according to the texture of the various soil horizons, and considerable changes of root development occur in passing from one horizon to another of different texture. The correct choice of mixtures for plantations must therefore involve a study of both specific differences and behaviour as regards soil texture throughout the profile.

2334. Majid, A. **Root systems of Ash and Sycamore [*Acer pseudoplatanus*] seedlings.** *J. Oxf. Univ. For. Soc.* (*Ser. 4*) No. 2, 1954 (18–21).

The root system of the Sycamore seedling consists of a long taproot with evenly spaced, short laterals, and remains fundamentally unchanged under widely different soil conditions. In contrast, Ash seedlings may have long or short taproots and few or abundant laterals at different levels according to conditions of soil and competition. The high mortality of Sycamore seedlings is ascribed at least partly to the lack of adaptability in their root system. *Author's summary.*

181.4. Reaction to Biotic Influences (Competition etc.) and Fire

See also Nos. 2323, 2355–8, 2544.

2335. Gordeev, A. V. Živye pni. **[Live stumps.]** *Priroda, Moskva* 42 (7), 1953 (114–5). [Russ.] A.P.B.

Some stumps of Crimean Pine [*Pinus nigra* var. *caramanica*] trees felled 6–12 years previously, were found to be alive—laying down annual rings and forming callus. Their age varied from 45 to 60 years. Excavation showed that they were connected by root-grafts to the root systems of standing trees near by. To gain some idea of their vitality, one stump was tapped for resin: it yielded an average of 15 g. per freshening as compared with 18 g. for living trees of the same diameter and age. Such live stumps are not rare in Crimean Pine stands. [Cf. *For. Abstr.* 13 (No. 1035).]

181.5. Reproductive Behaviour

See also Nos. 2264, 2270, 2334, 2373, 2382, 2390 *et seq.*, 2544.

2336. Wright, J. W. **Notes on flowering and fruiting of northeastern trees.** *Sta. Pap. Ntheast. For. Exp. Sta.* No. 60, 1953. pp. 38. 17 refs.

Acer spp., *Fraxinus* spp., *Quercus* spp., *Abies* spp., *Picea* spp. and *Pinus* spp. are discussed with regard to flowering habits, flowering and fruiting pattern and other phenological phenomena.

2337. Nielsen, P. C., and Muckadell, M. S. de. **Flower observations and controlled pollinations in *Fagus*.** *Z. Forstgenet.* 3 (1), 1954 (6–17). 11 refs. [E.e.g.]

[Cf. *For. Abstr.* 12 (No. 2685).] Observations were made on flushing and flowering of Beech, mainly at Kew Gardens but also elsewhere. The ♀ flowers begin to open shortly after the start of flushing, and the ♂s when flushing is finished. There are variations from the mean interval, however. Some protandrous individuals are found, and the degree of metandry varies with the weather. Unpollinated ♀ flowers of *F. sylvatica* are receptive to pollen over a period of 10–14 days, i.e. all the time the ♂ flowers are releasing pollen, and even later. A considerable number of experiments were carried out to find to what degree self-pollination takes place. The results vary from tree to tree and from year to year. *F. sylvatica* shows a rather high degree of self-sterility. Controlled pollination experiments show that *F. sylvatica* is parthenocarpous. Good success was obtained with crosses of *F. sylvatica* and *F. orientalis*. *From authors' summary.*

2338. Forshell, C. P. Kottens och fröets utbildning efter själv- och korsbefruktning hos tall (*Pinus silvestris* L.). **[The development of cones and seeds after self- and cross-fertilization of Pine.]** *Medd. SkogsforsknInst., Stockh.* 43 (10), 1953. pp. 42. 28 refs. [Sw.sw.e.] Price *Kr.*2.

A study was made for 2–3 years on cones and seeds obtained from free (F) or controlled (C) (cross- or self-) pollination on 28 mother trees. Results include the following: (1) Cone length was found to be characteristic of the mother tree, but there was a significant difference between cone length in different years and between cones resulting from different types of pollination, those from F being smaller on average than those from C. Cones from minus trees were significantly bigger than those from plus trees. (2) Seed production after F pollination varied with the mother tree. The total number of seeds/cone was similar for self- and cross-pollination and, for each mother tree, bore a characteristic ratio to that of F pollination. With one exception, the % of full seeds and the number of full seeds/cone were less after self-pollination than after F or cross-pollination. (3) The 1000-seed-weight of full seeds increased with cone size. Full seed from self-pollination had as high a 1000-seed-weight as F and cross-pollination. No correlation could be found between 1000-full-seed-weight and the amount of seed/cone; seed from minus trees had a higher average 1000-full-seed-weight. (4) Seed morphology and colour were found to be characteristic of

the mother tree. (5) The number of plants obtained, expressed as a % of seed sown, was lowest for seed from self-pollination; for F and cross pollination the % was roughly equal. Plus trees yielded a smaller % of plants than minus trees. (6) Pollen quality varied from tree to tree and from year to year. (7) Full seeds from cross- and self-pollination were examined by X-ray [cf. *For. Abstr.* 15 (No. 221)] for endosperm and embryo development. Cross-pollination gave a higher % of well developed full seeds than self-pollination on the same tree. No difference was found in seed development between plus and minus trees. There is a full English summary and results are given in graphs and tables with English legends.

2339. Siegl, H. Untersuchungen über den Samenertrag der Fichte im Herbst 1951. [**Investigations into seed production of Spruce during the autumn of 1951.**] *Forstwiss. Cbl.* 72 (11/12), 1953 (369–79). 4 refs. [G.g.]

Investigations were made on cone and seed production of Spruce of different Kraft (K) tree classes on 3 different sites. Cone production depends on crown development, the maximum number and also the highest average number of cones being found on trees of K class 1. Trees of K classes 1–3 on the stand margin that had been released 4 years previously, showed a considerable increase in cone and seed production compared with trees in the centre of the stand. K classes 1 and 2 (forming 60% of the stand by number and 80% by timber volume) bear 90% of the stand's total cone and seed production. The remaining 10% is contributed by classes 3 and 4, class 4 producing only in good seed years. No definite correlation could be found between average cone weight, % of sound seed and 1000-seed-weight on the one hand and K class on the other. Influence of attack by *Fomes annosus* on seed production is noticeable only in the later, severe stages of the disease. Average cone production of K classes 1 and 2 in a good seed year amounts to ca. 600/tree. Production of sound seed in the 3 stands varied between 7 million and 20 million/ha. Production of sound seed per 50 kg. of cones varied widely in individual trees in each K class.

2340. Boe, K. N. **Western Larch and Douglas-Fir seed dispersal into clear-cuttings.** *Res. Note Nth. Rocky Mt. For. Range Exp. Sta.* No. 129, 1953. pp. 3.

Seed studies in 1952 showed that the quantity of seed falling to the ground decreased rapidly from the timber edge to about 4 chains for Douglas Fir and 6 chains for Larch, remaining fairly constant at a low level beyond.

2341. Petrov, V. V. Počvennyĭ zapas semjan drevesnyh porod pod pologom dubravy. [**Seeds of woody species in the soil under mixed Oak woods of the steppe region.**] *Dokl. Akad. Nauk SSSR* 92 (5), 1953 (1073–5). 3 refs. [Russ.] A.P.B.

Reports briefly on the total numbers of seeds and the number of sound seeds (as judged by the cutting test) extracted from litter samples taken in the first half of Aug. 1952, when the spring germination was over and a new seed crop had not yet fallen, in the Tellerman forest, S. Voronezh. Results are tabulated. The most abundant was Ash (5–38 sound seeds/sq.m.) followed by Lime (0·6–2·8), Elms (0·2–1·8) and Field Maple (0·4–1). No good Norway Maple or Oak seed was found; ungerminated seed of these species appears unable to survive into the summer, when the litter becomes almost air-dry. Results are also tabulated of supplementary observations on one of the experimental areas to record similar data for different times of year. Data such as these are useful in deciding whether or not to remove litter to assist, or regulate the composition of, natural regeneration in these mixed woods.

2342. Koroleff, A. **Leaf litter as a killer.** *J. For.* 52 (3), 1954 (178–82).

Discusses the inhibition of germination and seedling mortality of valuable species caused by heavy litter and gives some extracts from answers to a questionnaire on this subject to some 50 American and Canadian foresters.

2343. Brayshaw, T. C. **An approach to the determination of moisture requirements for the germination of seeds of Douglas Fir, Ponderosa Pine and Engelmann Spruce.** *Res. Note U.B.C. For. Club* No. 8, 1953. pp. 5 + gph. 3 refs.

Seeds of the 3 species were germinated after soaking in sucrose solutions of various osmotic pressures and corresponding levels of moisture availability. Availability of water in the solutions is expressed in terms of pF (= the common logarithm of the pressures, in cm. of water, required to remove water from the medium containing it at that availability limit). In Douglas Fir seed, a well marked threshold of germination was reached at a moisture-availability of pF 3·9. Ponderosa Pine germinated very poorly but showed a probable limit in the same general range of pF. Engelmann Spruce showed a poorly defined limit apparently extending to lower pF values. *From author's summary.*

2344. Ferrell, W. K. **Effect of environmental conditions on survival and growth of forest tree seedlings under field conditions in the Piedmont region of North Carolina.** *Ecology* 34 (4), 1953 (667–88). 38 refs.

A study of 1-year-old seedling reproduction of *Pinus echinata, P. taeda, Quercus alba, Q. rubra, Liquidambar styraciflua* and *Cornus florida* (data tabulated and graphed) showed that for all species soil moisture was the most important single factor in survival. The Pines also need an early increase in relative illumination if they are to survive.

2345. McDermott, R. E. **Effects of saturated soil on seedling growth of some bottomland hardwood species.** *Ecology* 35 (1), 1954 (36–41). 5 refs.

Seedlings of Sycamore [*Platanus occidentalis*], River Birch, American Elm, Winged Elm, Red Maple, and Alder that had just developed their first true leaves were subjected to saturated soil conditions of varying time intervals followed by intervals of soil moisture at and above field capacity under conditions of approximately one-half sunlight and high soil temperatures. Comparisons of height growth in

10-day periods after the most favourable soil treatment (days), and height growth in 10-day periods after the most stunting soil-saturated treatment were made. After subjection to a sustained saturated substratum with subsequent well-drained conditions, River Birch and Red Maple seedlings recover very rapidly, Sycamore rapidly, and American Elm and Winged Elm at a moderate rate. The growth rate of Alder seedlings is accelerated by short intervals of soil saturation, and their growth is not significantly changed by sustained saturation intervals up to 32 days.

The relative degree of recovery from stunting induced by previously saturated soils of young seedlings of Alder, River Birch, Sycamore, American Elm, and Winged Elm may be indicative of their successional relationships and ultimate stand composition in bottomlands. *Author's summary.*

2346. VIEGHOFER, L. Die Rotbuchenverjüngung des Wienerwaldes in ihrer Abhängigkeit vom Boden. **[Beech regeneration in the Wienerwald in relation to soil factors.]** *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (30–43). 12 refs. [G.g.]

An opportunity to study Beech regeneration was provided by the specially good mast year of 1946. The factors investigated were soil cover, depth, stoniness, texture and parent material, and also aspect and overhead cover. Of these the soil/water/air ratio and field moisture content appear to be the most important. Germination and survival to 1949 were poorest on soil without any cover and on heavily grassed areas, and best on areas with light grass cover or litter of medium depth. Growth and survival to 1949 were best on soils of medium depth; the deep soils were usually in hollows and were damp, acid and poorly aerated. A high content of stones was unfavourable, but up to ca. 10% of stones was favourable to the young Beech, presumably helping to prevent soil compaction. Provided that adequate moisture was present, lighter soils showed the best growth and survival, and flysch [sandstone] was better than limestone. The effects of aspect depend on the local climate. Regeneration was more uniform, though slower growing, under canopy than at the margin of stands or in the open.

181.6. Life Form, Habit. Post-Seedling Development and Form

See also Nos. 2278–84, 2289, 2488, 2508, 2745–6.

2347. BURGER, H. Holz, Blattmenge und Zuwachs. XIII Mitteilung. Fichten im gleichalterigen Hochwald. **[Wood, quantity of foliage, and increment. XIII. Spruce in even-aged high forest.]** *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (1), 1953 (38–130 + 2 photos). 40 refs. [G.g.f.]

This final study follows the same general lines as its predecessors [cf. *For. Abstr.* 14 (No. 176)]. The data, presented in graphs and tables, relate to: (1) *Wood properties* (based on 4200 samples from even-aged and compared with 1560 from selection forest)—sp. gr. of sapwood and heartwood, green and dry; water and air content of sapwood and heartwood; and shrinkage, (2) *Crown and foliage in relation to increment in individual trees* (based on trees from a number of stands at different altitudes and varying from ca. 30 to 160 years in age)—with data on weight and number of needles and needle area and correlation of these factors with d.b.h. and stemwood increment. (3) *Crown and increment relations in stands*—with data from 3 stands aged 63, 65, and 66 years respectively.

2348. MOLCHANOV [MOLČANOV], A. A. **The reserves of needles in Pine trees in timber stands of different ages.** *Transl. U. S. For. Serv.* No. 374, 1953. pp. 6. 8 refs. Transl. by V. P. Morse from *Dokl. Akad. Nauk SSSR* 67 (5), 1949 (909–12). [Cf. *For. Abstr.* 14 (No. 177).] Limited distribution.

2349. KUNZ, R. Morphologische Untersuchungen in natürlichen Föhrendickungen. **[Morphological research in thicket-stage natural Pine reproduction.]** *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (2), 1953 (335–402). 148 refs. [G.g.f.]

A detailed study was made in 11 thicket-stage stands of *Pinus sylvestris*, to determine the influence of several environmental factors (dominance, release, cover, and the presence of Beech) on the following morphological characters: form factor of stems; number, basal diameter, length, angle, form factor and die-back of branches; and crown ratio (maximum width of crown/height of tree). The results are tabulated with both German and French legends. Branching was favourably influenced by both cover and mixture with Beech, while a too open environment encouraged a coarse branching habit.

181.7. Duration, Longevity, Stature; Records of Exceptional Age or Size. Effects of Age on Behaviour

See Nos. 2265–6, 2449, 2463.

181.8. Phenology

See Nos. 2286, 2336–7, 2365.

181.9. Miscellaneous [including Ecological Role after Death of Plants or Parts of Plants (but for Litter, see Section 114.3)]

See No. 2703.

182. *Synecology, Plant Sociology: General, Principles and Methods*

182.1. Palaeoecology. History of Vegetation

See also Nos. 2202, 2271–3.

2350. FIRBAS, F. Über die nachwärmezeitliche Ausbreitung einiger Waldbäume. **[The distribution of some forest species during the sub-atlantic and recent climatic periods.]** *Forstwiss. Cbl.* 73 (1/2), 1954 (1–8). 4 refs. [G.]

Points out, on the basis of the results of some pollen analyses, that human intervention has brought about far-reaching modifications in the European forests since the sub-boreal period, so that the term 'natural' forest cannot always strictly be applied.

2351. CONWAY, V. M. **Stratigraphy and pollen analysis of southern Pennine blanket peats.** *J. Ecol.* 42 (1), 1954 (117–47). 19 refs.

Tree-pollen curves indicate that changes of forest type in response to climatic trends are very slow and seem to be hardly complete before the climate changes again. The *Corylus* curves, however, suggest that while forest composition is changing, the forest tends to open up and allow the temporary increase of a light-demanding species such as *Corylus*.

2352. Kac, N. Ja., and Kac, S. V. Paleoèkologija i hronologija rasselenija eli v Evrope v poslevaldaĭskoe vremja. [**Palaeoecology and the chronology of colonization by *Picea abies* in Europe in the post-Valdai period.**] *Dokl. Akad. Nauk SSSR* 90 (4), 1953 (655–8). 14 refs. [Russ.] A.P.B.

A review of evidence from pollen-analytical data.

2353. Harris, W. F. **Palynology as a key to the history of New Zealand vegetation.** *Proceedings of the 7th Pacific Science Congress, New Zealand, 1949* Vol. 5 (Botany), 1953. pp. 164–78. 43 refs. Government Printer, Wellington.

182.2 Succession, Alternation and Periodicity in Vegetation

See also Nos. 2202, 2372, 2378–9, 2680

2354. Potzger, J. E. **Secondary succession in stands of Red Maple/Sweet Gum/Beech forests in Ripley County, Indiana.** *Butler Univ. bot. Stud.* 11 (3), 1953 (50–9). 7 refs. A.P.B.

Results of a study of 7 stands after logging or clearance for farming. Sweet Gum, Red Maple and American Elm are the most abundant species in the young stands. Composition varies according to the abundance of the dominants, for different groups enter at different time intervals. Soil moisture also influences the abundance of the participating dominants. Fidelity of the dominants is high.

2355. Woods, F. W. **Disease as a factor in the evolution of forest composition.** *J. For.* 51 (12), 1953 (871–3). 13 refs.

Discusses shortly the effects of epidemics caused by *Endothia parasitica* and *Phytophthora cinnamomi* on Chestnut and *Nectria coccinea* on *Fagus grandifolia* in North America.

2356. Spurr, S. H. **The forests of Itasca [, Minnesota] in the nineteenth century as related to fire.** *Ecology* 35 (1), 1954 (21–5). 7 refs.

Examination of fire scars on tree sections helped to determine forest history in the area during the 19th century. The present Pine (*Pinus banksiana* and *P. resinosa*) stands are a fire climax, and early burning or chemical control of hardwoods is necessary to preserve them.

2357. **Succession in gallery forest.** *Rep. For. Dep. Sudan 1951–52*, 1953 (46).

A census was made in 1939 in a strip of gallery forest along a river in Kagelu forest reserve. This strip had been protected from fire by plantations created on either side of it, beginning in 1910, although the strip itself was not planted. In 1939 it consisted mainly of a single row of *Syzygium guineense* on each bank. A fresh enumeration made in 1951 showed that with fire exclusion a succession is taking place to a wetter type of forest, consisting of *Khaya grandifoliola* and *Cola cordifolia*.

2358. ***Acacia mellifera*/grassland cycle.** *Rep. For. Dep. Sudan 1951–52*, 1953 (44).

Over much of its range Kitr (*Acacia mellifera*) is found in dense belts alternating with open areas of grassland. The Kitr tends to be even-aged and there are stands composed entirely of young trees and others of old moribund trees. When the trees become moribund, grass fires eventually kill them and the area reverts to grassland. The grassland is colonized after a time by young Kitr, and it is believed that a regular Kitr/grassland cycle occurs. Some small-scale experiments have been made to investigate some aspects of this cycle. Under middle-aged Kitr, ground flora is sparse and grass is insufficiently dense to burn, and at this stage Kitr areas are virtually fire-proof. As the dense stands begin to thin out owing to the death of old trees, grass comes in and fires will in a few years destroy the remaining trees and convert the area to grassland. The mechanism of recolonization by Kitr is not so clear but young trees are much more fire-resistant than old. The reason for this appears to be that in young trees the branches and leaves form a dense hemispherical mass, touching the ground all round the trees. A fire will scorch the leaves and ends of the young twigs, but will not penetrate to the main stems; in older trees the bark of the stem itself is exposed to fire, and hence the tree is killed.

182.3. Units of Vegetation (Associations etc.)

See No. 2374.

182.4. Layer Communities

2359. Newman, I. V. **Locating strata in tropical rain forests.** *J. Ecol.* 42 (1), 1954 (218–9).

The difficulty of defining the tree storeys in tropical rain forest is discussed and the use of height as the sole criterion is condemned. The author proposes three means of clarifying the analysis of such a complex community: (1) the omission of immature trees of a higher stratum in determining the position of a lower stratum; (2) using, for stratum determination, the height at which lateral branches are no longer shed (i.e. the lower limit of permanent branching); and (3) taking as the criterion of a tree's maturity that its main lateral branches are no longer shed.

187. *Vegetation Types*

See also Nos. 2184, 2193, 2217, 2219, 2236–7, 2257, 2261, 2331, 2359, 2480, 3144, 3150.

2360. Gaussen, H. **A proposed ecological vegetation map.** *Repr.* from *Surveying and Mapping, Washington* 13 (2), 1953 (168–73).

Makes proposals for a world vegetation map, which the author considers to be more useful than FAO's proposed land-use map.

2361. Gaussen, H. Les étages de végétation des Alpes, Pyrénées, Sierra-Nevada, Atlas. [**Altitudinal zones in the vegetation of the Alps, Pyrenees, Sierra**

Nevada, and Atlas mountains.] *Repr.* from *Compte Rendu du 78e Congrès des Sociétés Savantes de Paris et des Départements. Section des Sciences. Paris.* 1953. pp. 211–8. 5 refs. [F.]

Elaboration of a paper published in 1938.

2362. Passarge, H. Waldgesellschaften des mitteldeutschen Trockengebietes. [**Forest associations of the central German dry zone.**] *Arch. Forstw.* 2 (1), 1953 (1–58). [G.g.]

The area studied lies in the latitudes of Magdeburg, Dessau and Halle from the Harz mountains to the Elbe, where rainfall is 500 mm.; loess soils predominate, and the forest remnant is 1% of the area. Oak/Hornbeam has the widest spread. On the basis of 90 quadrats it is divided into a hill (150–350 m.) and a plains (60–80 m.) association-group, each of which is divided into dry and moist associations. The dry association of the hills (1) is Sessile Oak/Hornbeam with *Tilia cordata* plentiful; it has *Luzula*, *Pulmonaria*, and *Chrysanthemum* subassociations (s.a.'s). The moist association of the hills is left under query. The dry association of the plains does not discriminate between the Oaks and is also rich in *Tilia cordata*; it has *Festuca*, *Galeobdolon*, and *Euphorbia* s.a.'s. The moist association of the plains (2) is Pedunculate Oak/Hornbeam with *Milium*, *Stachys*, and *Melampyrum* s.a.'s. For (1), Douglas Fir, Spruce, Larch, Pine, Red Oak and Beech are rejected on the grounds of poor performance, susceptibility to drought or *Armillaria*, and inconvenient utilization of the soil horizons (illustrated for 6 species by photographs). The Sessile Oak (quality class I/II) is the best choice. Hornbeam and Lime should be part of the stand, with Sycamore and Norway Maples and Ash in sheltered situations, and *Ulmus glabra*, *Tilia grandifolia*, Larch, and Douglas Fir in the moistest sites. For the s.a's of (2), the following are recommended: for the *Stachys* s.a.—Ash, Maples and Poplar with soil-protecting accessory species (Hornbeam, *Prunus padus*, *Alnus glutinosa*); for the *Melampyrum* s.a., Douglas Fir and Larch could be brought into the existing Pine, with Red and Pedunculate Oaks, *Tilia cordata* and Hornbeam, where soil conditions require broadleaved spp.; for the *Milium* s.a., Poplar as well as Pine is a possibility, and more Douglas Fir and Larch should be planted. An admixture of broadleaved species would not be difficult. In special conditions of soil and water-table Oak and Hornbeam are also indicated for good performance in quality and quantity. Constancy tables are given matching these subassociations with others elsewhere in Germany and in Switzerland.

2363. Scamoni, A. Ein neuer Typ des Buchen-Traubeneichenwaldes aus dem Fläming und sein Vergleich mit Waldtypen des Jungdiluviums. [**A new type of Beech/Sessile-Oak forest from Fläming, compared with forest types of the late diluvial drifts.**] *Arch. Forstw.* 1 (1/2), 1952 (47–58). 6 refs. [G.]

This *Carex-pilulifera* type, considered to be a geographical variant of the *Querceto-Carpinetum luzuletosum* on earlier diluvial drifts, is assigned a place between the *Poa nemoralis* and the *Calamagrostis arundinacea* types, having closer relations with the latter. Plant lists for each type are given and the soils of the early and late diluvial drifts compared. Details are given of the vol., b.a., and increment of 233-year Oak and 138-year (understorey) Beech on the new type.

2364. Magini, E. **Preliminary observations on the types of Beechwood in the Vallombrosa forest.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 21 (No. 10), 1953. pp. 8. [E.] [Istituto di Selvicoltura, Università di Firenze.] Limited distribution.

Describes the characteristics of the undergrowth, tree layer, and soil for the 3 prevailing Beech-forest types: (1) with closed crown cover and more or less abundant herbaceous undergrowth in which exacting mesophilous species prevail; (2) with closed crown cover and little undergrowth, in which prevailing species may be exacting and mesophilous or unexacting and drought-resistant; and (3) a more or less deficient crown cover above abundant undergrowth with a prevalence of clearly drought-resistant species. Type 1 is very stable, and natural regeneration easy and abundant. Type 2 is much less stable and regeneration is less easy, but can be obtained in the better examples if fellings are carried out gradually and moderately. Stability in Type 3 is very low and natural regeneration usually impossible. Types 1 and 2 offer favourable conditions for the establishment of Silver Fir among the Beech.

2365. Ferente, A. Note floristiche e fenologiche nel territorio di Arneo (fra Taranto e Gallipoli). [**Floristic and phenological notes [on the vegetation of a *Quercus ilex* wood] between Taranto and Gallipoli.**] *Nuovo G. bot. ital. (n.s.)* 59 (2/4), 1952 (287–303 + 4 photos). 6 refs. [It.it.e.] A.P.B.

2366. Delfine, A. Residui di leccete pure e miste sulla Murgia di Putignano. [**Relict stands of *Quercus ilex* (pure and mixed) on the Murgia of Putignano [Apulia].**] *Nuovo G. bot. ital. (n.s.)* 59 (2/4), 1952 (378–87 + 5 photos). [It.it.e.] A.P.B.

2367. Bellot, F., and Casaseca, B. El *Quercetum suberis* en el límite Nordoccidental de su área. [***Quercetum suberis* at the north-western limit of its area.**] *An. Inst. bot. A. J. Cavanilles* 11 (1), 1952 (1953), (479–501 + 2 tbls.). 26 refs. [Span.] O.B.D.

A study of this association in north-western Spain.

2368. Oliveira, A. L. Franco de. Relações entre o solo e a vegetação no Plioceno a Sul do Tejo. [**Relationship between soil and vegetation on the Pliocene south of the Tagus.**] *Estud. Inform. Serv. flor. aqüíc. Portugal* No. 6–B3, 1953. pp. 57 + 1 dgm. + 3 photos. 29 refs. [Port.f.] Limited distribution.

Presents the results of physical and chemical studies of a number of different soil profiles and relates the different soil types to the 3 different plant communities associated with *Quercus suber* in this region.

2369. Goes, E. da S. Reis. Um estudo em montados de sobro. Relações entre o solo e a vegetação no Plioceno a Sul do Tejo. [**A study of Cork Oak stands. Relationship between soil and**

vegetation on the Pliocene south of the Tagus.] *Estud. Inform. Serv. flor. aqüic. Portugal* No. 7–C3, 1953. pp. 36 + 6 photos + 1 map + 1 dgm. + 3 tbls. 30 refs. [Port.] Limited distribution.

A survey of plant associations of the Cork Oak stands in this region, in which 3 main types are distinguished. [Cf. preceding abstract.]

2370. Yoshioka, K. **On the types and development of Japanese Pine forests.** *Ecological Review, Japan* 11, 1950 (204–16). From *abstr.* in *Jap. Sci. Rev. (biol. Sci.) 1949–50* No. 1, 1952 (31, 132). I.I.E.

Extensive areas of Japan are occupied by *P. thunbergii*, mainly on coastal sites, and *P. densiflora*, mainly on inland sites. Two associations are distinguished for each species, one in the warm temperate and the other in the cool temperate region. These forests were originally confined to non-cultivated areas, but they are now spread all over the country as a result of afforestation and semi-natural establishment of forests on open areas caused by fire, grazing etc.

2371. Nomoto, N. [**The warm-temperate forest of south-western Shikoku.**] *Bull. Tokyo Univ. For.* No. 45, 1953 (121–43). 14 refs. [Jap.jap.e.]

Lists the species found in the different associations.

2372. Misra, R., and Joshi, N. K. **The forest-complex of Patharia hill, Sagar.** *J. Indian bot. Soc.* 31 (3), 1952 (154–70). 12 refs. O.B.D.

Presents data on the climate, geology and soil of this area, and on 7 types of community that are distinguished in the vegetation, postulates a basic type of forest from which the variants may have derived, and presents a scheme showing succession in the forest types.

2373. Wyatt-Smith, J. **The vegetation of Jarak Island, Straits of Malacca.** *J. Ecol.* 41 (2), 1953 (207–25 + 5 photos). 10 refs. [Forest Research Institute, Kepong.]

A survey has been made of the flora of this small island lying about 40 miles (64 km.) off the coast of Malaya. Analysis of the methods of seed dispersal of the higher plant species showed that, apart from 6 sea-borne, 2 man-introduced, and 3 wind-borne species, and *Tarrietia javanica* (a species with a large winged seed probably sea-dispersed) they are all species distributed largely by birds and fruit-eating bats. The reasons for this oceanic type of flora are discussed, and the burial of the island in volcanic ash from Toba in Sumatra is considered the most probable. *From author's summary.*

2374. Schnell, R. La végétation forestière de l'ouest africain. [**Forest vegetation of West Africa.**] *Repr.* from *Lejeunia, Liége* 16, 1952 (1953), (11–6). [F.e.] In *Flora and Vegetation of Tropical Africa*, Papers presented at Symposium organized by A.E.T.F.A.T., Brussels, 24–27 Oct., 1951.

The associations of the dense rain forests have these peculiarities:—(1) a considerable floristic element is not confined to any one association. (2) Chance plays a very important part in distribution. (3) Characteristic species of the association seem more *selective* and *preferential* than *exclusive* (in Braun-Blanquet's senses). (4) The association usually has a very wide geographical range with many variants and intermediates. These associations are expressions of dynamic equilibrium rather than units of static floristic composition. *From author's summary.*

2375. Exell, A. W. **The vegetation of the islands of the Gulf of Guinea.** *Repr.* from *Lejeunia, Liége* 16, 1952 (1953), (57–66). [E.f.] In *Flora and Vegetation of Tropical Africa*, Papers presented at Symposium organized by A.E.T.F.A.T., Brussels, 24–27 Oct., 1951.

Gives lists of species for Principe, Santo Tomé and Annobon, which lie with Fernando Po along the same N.E.–S.W. axis as the Cameroons. A regressive formation of the forests at 1200–2000 m. in the last island is described. In S. Tomé the lower rain forest lies at 0–800 m., the mountain rain forest at 800–1400 m. and the mist forest at 1400–2024 m. The % of endemics is high, ranging from 12 in Fernando Po to 19·4% in S. Tomé. Reservation of the remaining virgin forests of S. Tomé is recommended.

2376. Mendonça, F. A. **The vegetation of Mozambique.** *Repr.* from *Lejeunia, Liége* 16, 1952 (1953), (127–35). [E.f.] In *Flora and Vegetation of Tropical Africa*, Papers presented at Symposium organized by A.E.T.F.A.T., Brussels, 24–27 Oct., 1951.

One-half of the area of Mozambique lies below 300 m. with 600–1000 mm. annual rainfall; the higher elevations attain to 2000–2300 m., receiving 1000–2000 mm. The *Brachystegia/Pseudoberlinia* forest covers $\frac{2}{3}$ of the territory. It is degraded, by continued clearing, into savannas and steppes but quickly regenerates to *B. spiciformis* if clearings are abandoned early. At 600 m. are *Podocarpus milanjianus* forests, and eastern aspects at 800 m. carry *Piptadenia/Khaya*. Galleries of *Khaya/Adina* and edaphic types like the pure *Androstachys johnsonii* also occur. Belts of *Colophospermum/Kirkia* forest extend along the Sabi Limpopo and Zambesi rivers.

2377. Wild, H. **Vegetation survey of the Changara (Portuguese East Africa)-Mkota Reserve (S. Rhodesia) area.** *Rhod. agric. J.* 50 (5), 1953 (407–19 + 1 map). E.M.B.

A description of the vegetation with a list of species collected during the survey.

2378. Frey, D. G. **Evidence for the recent enlargement of the 'bay' lakes of North Carolina.** *Ecology* 35 (1), 1954 (78–88). 15 refs.

Evidence, based chiefly on the age and morphology of Cypresses (*Taxodium ascendens*) growing offshore, suggests that these lakes have been expanding during at least the past 500 years.

2379. Parmelee, G. W. **The Oak upland continuum in southern Michigan.** *Abstr. of thesis*, in *Dissert. Abstr.* 13 (5), 1953 (646). 4 refs. O.R.S.

Quadrat data have been collected for trees, shrubs and herbs from 36 stands in 17 counties. Importance values [cf. *For. Abstr.* 13 (No. 1074)] were computed for each tree species and weighted by climax adaptation numbers to give continuum index (c.i.) numbers ranging from 751 to 1999. Curves developed from these data are discussed;

results include the following: (1) The most contrasting stands differed less by kind of dominants than by proportion of dominants. (2) The majority of shrub and herb species were found to show definite correlations with c.i. sequence. (3) The scale sector between index values of 1350 and 1400 was tentatively recognized as a boundary separating stands having Black Oak as one of the two leading dominants from those in which Red Oak has a similar position. (4) Stands developed on S. aspects had significantly lower c.i. numbers than those developed on N. aspects. (5) Except on N. slopes, severe disturbance was reflected by a significant lowering in c.i. numbers. (6) A general correlation was noted between c.i. number and soil texture. The data obtained in this study were also used in an attempt to test various climax hypotheses for the area.

2. SILVICULTURE

See also Nos. 2310, 2323–5.

2380. Köstler, J. N. Waldpflege: Waldbauleistungen und Waldgesinnung in süddeutschem Privatwald; zugleich ein Wegweiser für die Waldbaupraxis. **[Care of the forest: silviculture and forest-mindedness in the private forests of S. Germany; a guide to silvicultural practice.]** Paul Parey, Spitalerstrasse 12, Hamburg 1. 1953. pp. 200. 2 pp. of refs. [G.]

This work, a supplement to the author's textbook of silviculture [see *For. Abstr.* 12 (No. 1038)], consists of a selection of examples—drawn mostly from personal inspections—of practical solutions to the chief silvicultural problems of the region, where private forests make up 41% of the total forest area. The matter is arranged under the main heads: Care of the soil (natural and artificial mixtures, plantations, conversion of pure stands, soil cultivation and fertilizing, afforestation); Care of the crop (selection forest stands, young growth and thicket stands, fencing, selective thinning, pruning, light-increment fellings, high forest with reserves, conversion of coppice-with-standards to high forest, several-storeyed stands, use of exotics); Care of the countryside (healthy forests, protection forest, forest margins, rare and remarkable trees, open-grown trees, park and forest). Each topic is briefly discussed with a few typical examples, and illustrated in many cases by photographs or diagrams. The data given are in most cases necessarily brief and somewhat scanty, both from considerations of space and because detailed records of stand history and increment were not available for many of these forests.

2381. Pěstování borových porostů. **[Silviculture of Scots Pine stands.]** *Lesn. Knihovna* (*malá Řada*) No. 17, 1952. pp. 191. 5 refs. [Cz.; Slovak.] Price *Kčs.*54.

Contains 11 articles [all but 2 in Czech]: (1) Significance of environment for Czechoslovakian Pine stands (*B. Mařan*); (2) Biology and silviculture of *Pinus sylvestris* (*A. Mezera*); (3) Occurrence of Pine in forest stands of Bohemia and Moravia (*J. Šindelář*); (4) Analysis of the variable characteristics of some Pine stands, especially younger ones (*J. Šindelář*); (5) Experience in Pine growing in the Plzeň region (*J. Ženišek*); (6) Silviculture and regeneration of Pine stands in Zahorie (*G. Krébes*) [Slovak.]; (7) Conversion of Pine stands into mixed ones (*H. Konias*); (8) Survey of Pine forest pests and their control (*A. Pfeffer*); (9) Mammal and bird pests of Pine forests (*F. Turček*) [Slovak.]; (10) Agencies damaging *P. sylvestris* and their control (*A. Kalandra*); and (11) Potentialities of silvicultural technique in Pine stands in Czechoslovakia (*B. Polanský*).

2382. Slocum, G. K., and Miller, W. D. **Virginia Pine: reproduction, growth and management on the Hill Demonstration Forest, Durham County, N.C.** *Tech. Bull. N.C. agric. Exp. Sta.* No. 100, 1953. pp. 52. 33 refs.

Deals with reproduction, natural and artificial regeneration, increment and yield, tending, management, pests, uses and properties of timber, and gives volume tables (including bark volume) for *Pinus virginiana*.

22. SILVICULTURAL SYSTEMS. CONSTITUTION AND COMPOSITION OF STANDS; FORMS OF STAND

221. *High Forest Systems*

See also Nos. 2380, 2396, 2515, 2761, 2775.

2383. Husch, B. **The regeneration of *Prunus serotina* in northwestern Pennsylvania following cutting.** *Ecology* 35 (1), 1954 (11–7). 4 refs.

Evidence derived from this study indicates that clear-cutting in narrow strips or cutting to low diameter limits in small patches are promising methods of regenerating *P. serotina*. [Cf. *For. Abstr.* 14 (No. 3233).]

2384. Eyre, F. H., and Zillgitt, W. M. **Partial cuttings in northern hardwoods of the Lake States: twenty-year experimental results.** *Tech. Bull. U.S. Dep. Agric.* No. 1076, 1953. pp. 124. 146 refs.

The work is divided into 3 main parts: (1) summarizing the characteristics of the northern hardwood forest; (2) discussing the management of mature stands, with recommendations for hardwood forests based on results in the experimental area, which has been treated by clear felling, light or heavy improvement felling, felling to different diameter limits, removal of overmature and defective timber, or group selection, and with special recommendations for stands of *Tsuga canadensis*; and (3) discussing the rather different treatment needed in the younger, second-growth stands.

222. *Coppice, Pollarding and Lopping Systems*

2385. Cointat, M. Surface terrière des taillis de chêne vert. **[Basal area of *Quercus ilex* coppice.]** *Rev. for. franç.* 5 (12), 1953 (829–31). 2 refs. [F.]

The basal area of *Q. ilex* coppice, 25 years after cutting, is 10–50 sq. m./ha. depending on soil, variety of tree etc. On medium to good soils the rotation should be increased to 35–40 years, but on poor sites it should not exceed 30 years.

226. *Changes of Silvicultural System. Conversion (by System or Species)*

See Nos. 2380–1, 2493, 2515.

228. *Constitution and Composition of Stands; Tree Classes; Forms of Stand*

See also Nos. 2204, 2206, 2227, 2339, 2349, 2359, 2362, 2380, 2627, 2760.

2386. Cvek, S. Kakšni naj bodo naši kraški gozdovi. **[What Slovenian Karst forests should be like.]** *Gozd. Vestn.* 11 (10), 1953 (295–304). 12 refs. [Sloven.sloven.]

A brief review of relevant suggestions by other authors is followed by the recommendation to foster the development of the natural associations in the area, viz.: *Quercetum ilicis*, *Carpinetum orientalis*, *Ostryeto-seslerietum autumnalis*, *Fagetum*, *Fagetum seslerietosum autumnalis*. These are briefly described.

2387. Costin, A. B. **On coniferous forests in Australia.** *Aust. For.* 17 (1), 1953 (21–5). 5 refs.

Points out the dangers of monocultures with particular reference to the probable ill effects on soil fertility of continuous short-rotation crops of *Pinus radiata* in Australia. Recommends research on possible mixtures or alternation with broadleaved species.

2388. Westveld, M. **A budworm vigor-resistance classification for Spruce and Balsam Fir.** *J. For.* 52 (1), 1954 (11–24). 11 refs.

Previous criteria for tree vigour [cf. *For. Abstr.* 10 (No. 2272)] are extended to cover maturity, the vigour-resistance indices being increased to give a range from 0 for the overmature, suppressed tree with short crown to 10 for a young dominant with a long crown. The field criteria for marking include maturity, dominance class, crown width, crown ratio, crown density, and bark and branch characters, all fully illustrated. A table shows the volumes removed and left in a 50-year softwood stand under selective cutting in 3 grades. [Cf. *For. Abstr.* 9 (No. 1903); 12 (No. 766].)

2389. Guttenberg, S. **Loblolly crown length—clue to vigor.** *Sth. For. Notes Sth. For. Exp. Sta.* No. 88, 1953 (1).

Measurements on sites with an index of 80 to 85 at Crossett showed that trees that had grown about 1·5 in. in diameter in the last 5 years now have 37–45% of their total height in live crown, regardless of tree diameter in the range 10–20 in. Slower growing trees have less crown length and faster ones more. [Cf. *For. Abstr.* 15 (No. 581).]

23. REGENERATION AND FORMATION OF STANDS

231. *Natural Regeneration*

See also Nos. 2339–46, 2364, 2381–3, 2497–8.

2390. Schoenike, R. E., and Schneider, A. E. **The extent and character of regeneration in uncut Black Spruce [*Picea mariana*] swamp stands of North-Central Minnesota.** *Minn. For. Note* No. 26, 1954. pp. 2.

2391. Wenger, K. F. **The stimulation of Loblolly Pine seed trees by preharvest release.** *J. For.* 52 (2), 1954 (115–8). 12 refs.

In 1946, trees of a single quality class were paired for height, diam., crown dimensions, age, and current cone production, and one of each pair was freed to a mean radius of 20 ft. By 1949, the released trees bore an average of 51 cones against 5 for controls, and in 1950 and 1951, 107 and 132 against 16 and 48. No differences were found in % of infested cones, defective seed, or seeds per cone. The cone crop after release accorded more closely with pre-release cone crops than with diam., though these last two factors were closely related Based on the poor 1949 production, a table shows the number of seed trees required per acre (according to diam. and production before release) to give a 90% milliacre stocking in undisturbed (litter-covered), burned, and tractor-logged seedbed conditions, e.g. for the last, 4–13 trees, 15 in. diam. and previously bearing 30 or more cones, would probably suffice.

2392. Trousdell, K. B. **Favourable seedbed conditions for Loblolly Pine disappear 3 years after logging.** *J. For.* 52 (3), 1954 (174–5). 8 refs.

A study of seedling establishment from a given quantity of seed, 1, 2, 3, and 4 years after (*a*) logging, (*b*) logging and slash burning, (*c*) logging and disking, showed a steady decrease with time on all treatments. Average numbers of seeds necessary to produce one seedling in the 4 successive years were 14, 50, 162, and 212.

2393. Gayle, W. B., and Gilgan, W. W. **The effect of slash burning on germination and primary survival of Lodgepole Pine and Douglas Fir.** *Res. Note U.B.C. For. Club* No. 2, 1951. pp. 3.

Seed was sown in flats in soil taken from a Douglas Fir stand and treated as follows: (1) unburned with ash added; (2) unburned control; (3) burned, not leached; (4) moderate burn, leached; (5) extreme burn, leached; (6) burn after rain, leached; (7) burned, humus added, leached. The leaching was done to simulate the effects of a winter's rain. Treatment (3) resulted in lowest and slowest germination. Top/root ratio increased with increasing amount of humus found in the soil and hence decreased with intensity of burn. Treatment (4) gave high germination in both species. The pH showed little variation with different burning treatments but definite changes with the addition of either ash or humus. [Cf. *For. Abstr.* 15 (No. 2609).]

2394. Cooper, R. W. **Keeping Sand Pine woodlands in production.** *Sth. Lumberm.* 187 (2345), 1953 (154–5).

Recent research has shown that the sun's heat reflected from the soil will open cones of *P. clausa* on slash lying near the ground. Stands should be clear felled in autumn and early winter and the soil should be stirred up by tractor logging and skidding. [Cf. *For. Abstr.* 14 (No. 239; 15 (No. 2475).]

2395. **[Measures to encourage natural regeneration of *Podocarpus milanjianus*.]** *Rep. For. Dep. Sudan 1951/52*, 1953 (20).

Natural regeneration of *P. milanjianus* is abundant on the fringes of high forest and under secondary forest, particularly on the higher elevations. It is proposed to accelerate this process by sowing or planting of open grassland with *Hagenia anthelmintica*, under the shade of which *Podocarpus* seedlings can germinate and establish themselves. The growth of natural seedlings can probable be increased by removing excessive overhead shade, and an experiment on these lines has been laid down.

2396. KASHIMURA, D., SAITO, H., and KIDA, S. **[Experiments on the shelterwood system in Buna (*Fagus crenata*) forest. (II) Seed production.]** *J. Jap. For. Soc.* 35 (9), 1953 (282–5). 4 refs. [Jap.e.]

Part I [*J. Jap. For. Soc.* 33, 1951 (268)] reported on a statistical analysis of stand structure in an experimental area. Part II includes tabulated data on number and volume of trees in the area before and after felling. The number of seedlings established since the heavy seed crop of 1950 and the production of seed in 1952, when the crop was above average, have been studied. The following results were obtained: (1) Heavy seed crops occur at intervals of 4–6 years (not 5–7 as is generally stated) and there is enough seed for regeneration in alternate years; (2) seed fall starts in late September, is heaviest from 15 to 25 Oct., and probably ends late in Nov.; (3) averages obtained for seed production were 97/sq.m., 3000/tree in an unfelled area, 10,000/tree in an area with 30–60% of the canopy removed and 20,000 in one with 80% removed; and (4) no significant relationship was found between the number of seeds falling and wind velocity. It is concluded that at least 50 trees/ha. should be retained. *From authors' summary.*

2397. SANDBERG, D., and SCHNEIDER, A. E. **The regeneration of Aspen by suckering.** *Minn. For. Note* No. 24, 1953. pp. 2.

Summarizes the results of two studies: (1) on the phenomena of suckering in *Populus tremuloides*, (2) on the conditions favouring the regeneration of *P. tremuloides* stands by suckering.

232. *Artificial Regeneration*

See also Nos. 2381–2.

2398. ROGERS, L. J. **Reforestation of Paraná Pine: extracts from a formal report submitted to the Government of Brazil.** *Unasylva* 8 (1), 1954 (15–8).

Mainly recommendations for methods of artificial regeneration of *Araucaria angustifolia.*

2399. FISCHER, F. Die Nachzucht des Nussbaumes als Waldbaum: (*Juglans regia* L. und *J. nigra* L.). **[Growing Walnuts (*J. regia* and *J. nigra*) as forest trees.]** *Mitt. schweiz. Anst. forstl. Versuchw.* 29 (2), 1953 (267–92 + 1 photo + 1 gph.). 17 refs. [G.g.f.]

Reports on an experiment started in 1946, using seed of different provenances on two different sites. Seed should be cleaned, stratified, and planted as soon as germination begins. One-year seedlings were used as planting stock. Root pruning is essential when they are planted out in the field, which should be done in groups at a spacing of 1·5 × 1·5 m. Good results are obtained on poor as well as good soils, provided that they are light and well drained. Release from competing vegetation is necessary. [Cf. *For. Abstr.* 15 (No. 2324).]

232.1. Choice and Trial of Species, Races etc.

See also Nos. 2362, 2479–82, 2484–9, 2518, 2593.

2400. Rychle rostoucí dřeviny a jejich pěstování. **[Fast-growing trees and their cultivation.]** *Lesn. Knihovna (malá Řada)* No. 30, 1953. pp. 143. 27 refs. [Cz.; Slovak.] Price *Kčs.* 8·75.

Contains 9 articles [all but 2 in Czech]: (1) Classification of Poplars from the botanist's and grower's point of view; improvement of Poplars (*V. Špalek*); (2) List of the *Salix* species (*V. Špalek*); (3) Survey of sites in the Poplar areas of Czechoslovakia (*J. Pelišek*); (4) Rearing of young plants of Poplar, Willow and Aspen (*M. Vojbuš*) [Slovak]; (5) Rearing of Poplars and Willows (*G. Krébes*) [Slovak]; (6) Diseases and pests of Poplars (*A. Kalandra*, *A. Pfeffer*, *J. Kudler* and *M. Kudela*); (7) Aspen (*F. Sigotský*); (8) Alder (*J. Michálek*), and (9) Birch (*J. Mottl*).

2401. DIETERICH, H. Die Baumhaselnuss. **[*Corylus colurna*.]** *Holz-Zbl.* 80 (14), 1954 (153). [G.]

Advocates introduction of *C. colurna* into Germany as a hedgerow tree and for timber.

232.11. *Species Trials (by Localities), including Forest Gardens, Trials of Exotics etc.*

See also Nos. 2489, 2547, 2802.

2402. AUBERT, C. G. Le cèdre dans l'ouest de la France. (L'exemple de la Roche-de-Bran.) **[The Cedar in the west of France: An example at La Roche-de-Bran.]** *Rev. for. franç.* 5 (12), 1953 (817–21). [F.]

Describes a stand of Cedars [*Cedrus atlantica*?] consisting of some 160 trees of 0·35–1·15 m. diam. and 20–25 m. high. They are regenerating naturally.

2403. MACDONALD, J. A. B. **The place of *Pinus contorta* in British silviculture.** *Forestry* 27 (1), 1954 (25–30). 2 refs.

[Cf. *For. Abstr.* 14 (Nos. 1123, 1186).] This Pine has a wide geographical range and shows sufficiently marked differences between races to justify their consideration as two, if not three, distinct trees. Recent assessments in provenance collections have underlined these differences, in particular the high value of the coastal race as distinct from the inland race as a shade-caster and as a suppressor of vegetation. While the Pine's use is limited to the afforestation of the poorer moorland sites, there is within these limits considerable scope for its introduction in one or other of its forms, either pure on the poorest sites where often nothing else is worth planting, or in mixture on rather better sites to assist in the establishment of more valuable species. The author considers each site briefly in turn, using the classification in Anderson's *Selection of Tree Species*

and drawing on his own experience of the value of the tree. *From author's summary.*

2404. SCHANTZ-HANSEN, T. **Growth of Scotch Pine plantings on the Cloquet experimental forest.** *J. For.* 52 (1), 1954 (39–40). 4 refs.

Diam., b.a., and volume growth in 35 years is superior to that of Jack Pine. The seed is of Russian (probably northern) provenance and trees stood up relatively well to the 1947–48 winter.

2405. **Mexican Cypress continues rapid growth.** *Carib. For.* 14 (1/2), 1953 (20–1, 52). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13, [1952?]).

Cupressus lusitanica, which was introduced 4 years ago into Puerto Rico, has made outstanding progress and is growing well in a wide range of conditions, both in the shade and in the open and on the poorest soils of the island. A 4-year-old plantation in the Luquillo forest on a deep but waterlogged soil has reached a height of 12 ft. A 2½-year-old plantation in the Toro Negro forest on an exposed slope and a rocky, shallow soil has an average height of 7 ft., with individual trees reaching 12 ft.

2406. PARRY, M. S. **Tree planting in Tanganyika. II. Species for the highlands.** *E. Afr. agric. J.* 19 (2), 1954 (89–102). 10 refs.

Notes on experience of over 50 suitable spp. including Araucarias, Cypresses, Eucalypts, Pines, and indigenous spp.

2407. MÉTRO, A. Expérimentation concernant l'emploi des Eucalyptus dans les reboisements marocains. **[Research on the use of *Eucalyptus* in afforestation in Morocco.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953*, Section 22 (No. 16), 1953. pp. 6. [F.] Limited distribution.

Preliminary results showing effects of initial density of plantations of *E. rostrata* planted in 1945 and measured in 1953. Other species under trial include *E. gomphocephala*, *E. sideroxylon*, *E. globulus* and *E. astringens*.

2408. GALOUX, A. Essais d'*Eucalyptus* au Katanga (Congo Belge) et en Belgique. **[Trials of Eucalyptus in Katanga (Belgian Congo) and in Belgium.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ, 1953* Section 22 (No. 15), 1953, pp. 2. [F.] [Stations de Recherches des Eaux et Forêts, Groenendaal (Hoeilaart).] Limited distribution.

Tabulates figures for height growth of 20 species in Katanga. In trials in Belgium most trees died during the first winter and future experiments will be confined to species with some chance of survival.

2409. GILKENS, H. Quelques *Eucalyptus* à tannin. **[Some tannin-bearing *Eucalyptus* species.]** *Bull. agric. Congo belge* 45 (1), 1954 (95–144). 10 refs. [F.flem.]

Describes the silviculture, botanical characters, wood properties and uses, and tannin content of *E. astringens*, *E. calophylla*, *E. brockwayi*, *E. corynocalyx*, *E. diversicolor*, *E. occidentalis oranensis*, *E. sideroxylon*, *E. smithii*, and *E. wandoo* and discusses their suitability for trial in the Belgian Congo.

2410. ***Eucalyptus* experience summarized.** *Carib. For.* 14 (1/2), 1953 (17–20, 49–52). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13, [1952?].)

Since 1940 more than 2000 acres have been planted with *Eucalyptus robusta* and *E. kirtoniana* in the state forests of Puerto Rico, and seeds of additional species have been planted experimentally on different sites. Brief reports are presented on the progress of 14 species.

2411. WADSWORTH, F. H., and MARRERO, J. **The significance to Puerto Rico of Companhia Paulista experience with *Eucalyptus*.** *Carib. For.* 14 (1/2), 1953 (65–91). 1 ref. [E.Span.]

Reviews the work of the Companhia Paulista, discusses experiences to date with Eucalypts in Puerto Rico, and makes some recommendations for future work.

2412. **Mago [*Hernandia sonora*] makes outstanding growth on north coast.** *Carib. For.* 14 (1/2) 1953 (26, 57). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13, [1952?].)

H. sonora has shown itself well adapted to loose, shallow soils in the St. Just Experimental area, Puerto Rico. An 8-year-old plantation averages 3 in. in diam. and 30 ft. in height.

2413. **Teak silviculture tested in two sites.** *Carib. For.* 14 (1/2), 1953 (27–8, 59). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13, [1952?].)

A report on plantations of *Tectona grandis* established on good sites in Puerto Rico.

2414. **Mesquite outgrown by West Indian Mahogany on south coast.** *Carib. For.* 14 (1/2), 1953 (29, 59–60). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13 [1952?].)

Average annual diameter growth of *Prosopis juliflora* in the Guánica forest, Puerto Rico over a period of 7 years was 0·13 in., as compared with 0·19 in. for *Swietenia mahagoni* in a stand now 20 years old. Since the latter species is more valuable it should replace Mesquite on deeper soils.

2415. **The present and potential contribution of the forests.** *Carib. For.* 14 (1/2), 1953 (10–1, 43–4). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13, [1952?].)

Casuarina equisetifolia grows exceptionally fast in Puerto Rico and is suitable for planting on protected coastal sands. A 20-year-old plantation on nearly sterile sand near Luquillo has attained an average diameter of 16·2 in. [Cf. *For. Abstr.* 14 (No. 260).]

2416. BARRET, W. H. G. Las coníferas cultivadas en la región del Parque Nacional Nahuel Huapí. **[Conifers cultivated in the region of the National Park of Nahuel Huapí.]** *Idia* No. 63, 1953 (14–5). [Span.] C.G.B.

A list of forest and ornamental species (mainly exotic) that have been tried out in this region of Argentina. [Cf. *For. Abstr.* 15 (No. 3141).]

232.12. *Races and Provenance Trials*

See also No. 2403.

2417. SHIGEMOTO, M. **[The growth of various races of Sugi (*Cryptomeria japonica*) at Kitayama, Kyoto. (II) Comparison of the growth of various races of 'Shirosugi'.]** *J. Jap. For. Soc.* 34 (11), 1952 (348–50). [Jap.e.]

In a 12-year stand of Honjiro, Mineyamajiro and Hozukijiro (which with Konentanijiro form the Shirosugi race of Sugi), Honjiro and Mineyamajiro were similar in diameter and height, with Hozukijiro less than either. [Cf. *For. Abstr.* 14 (No. 3274).] *From author's summary.*

2418. Veen, B. **Report of a tour of inspection along the [European] test areas of the International Provenance trials with Larch, Pine and Spruce of 1938/39 and 1944/45 and suggestions for future treatment and assessments.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome 1953*, Section 22 (No. 11), 1953. pp. 44. [E.] Limited distribution.

Data so far available are tabulated. Recommendations on standardization of lay-out and measurements are made. Eastern Europe, Turkey, Canada and the U.S.A. are not covered by this report.

2419. Edwards, M. V. **Scottish studies of the provenance of European Larch.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 22 (No. 1), 1953. pp. 5. 7 refs. [E.] [Forestry Commission, Great Britain.] Limited distribution.

Experiments have been in progress since 1939 on the growth of Larch of different provenances on different sites. Results so far suggest that Sudeten Larch is superior, and Larch from other European sources (Tyrol, Alps, and Silesia) no better than, and sometimes inferior to, that of Scottish provenance. Morphological differences observed include the following: (1) Darnaway and Sudeten provenances have a wider crown in proportion to their height than the Alpine provenances; (2) Scottish Larch has a good stem form, and Alpine Larch often has a coarse thick branching habit. On young trees 10–20 ft. high the number of branches (at 4–6 ft. above ground) is greater and the ratio between girth of the largest branch in this area and g.b.h. is smallest for Sudeten and largest for Alpine provenances, Scottish Larch being intermediate in branch size; (3) considerable differences of cone size exist in Scottish Larch. The small cone characteristic of Sudeten Larch was found on all plots raised from seed of guaranteed variety *sudetica* from Czechoslovakia.

2420. Gothe, H. Die Schlitzer Lärchen. [**The Schlitz Larches.**] *Allg. Forst- u. Jagdztg.* 123 (5), 1952 (126–33). 11 refs. [G.]

A lecture reviewing the history, general silvicultural behaviour (especially in mixed stands) and growth of Larch in this region of Hesse, with special reference to site factors and provenance. [Cf. R. Schober and E. Münch, *Allg. Forst- u. Jagdztg.* 111, 1935 (73 . . . 345).]

2421. Wakeley, P. C. **Progress in study of Pine races.** *Sth. Lumberm.* 187 (2345), 1953 (137–40).

An interim report on a study by the permanent Committee on Southern Forest Tree Improvement on the effect of *P. taeda*, *P. echinata*, *P. palustris* and *P. elliottii* provenances on their growth in a region stretching from Maryland to Florida and west to Texas.

2422. Schantz-Hansen, T., and Jensen, R. A. **A study of Jack Pine source of seed.** *Minn. For. Note* No. 25, 1954. pp. 2.

Preliminary report on a provenance trial established in 1942 at Cloquet Experimental Forest. In general, selections moved north have shown better height growth than those moved south.

2423. Cram, W. H., and Brack, C. G. E. **Performance of Scotch Pine races under prairie conditions.** *For. Chron.* 29 (4), 1953 (334–42). 9 refs.

A study was made of the vigour and seed production of *Pinus sylvestris* of 6 geographical races planted in 1908–24 at the India Head Forest Nursery Station (altitude 1936 ft., mean annual precipitation 17 in., frost-free period 74–103 days). The Scottish race exhibited superior vigour, the Russian race highest survival after 41 years, and the Riga race the most consistent production of cones in 1947–52. The values of seeds per cone, seed weight, and seed viability varied greatly from year to year for individual trees of all races.

2424. Mathauda, G. S. **The all-India Teak seed origin sample plots.** *Indian For.* 80 (1), 1954 (10–23). 3 refs.

A paper read at the 8th All-India Silvicultural Conference, 1951. The sample plots were laid out in 1930 and the latest measurements bear out earlier findings that generally, within the natural range of Teak, local seed is likely to give good results but may not prove to be the best. Of imported seed, that from dry localities is usually inferior to that from moist. [Cf. *For. Abstr.* 6 (p. 147).]

232.13. *Trials of Hybrids and Other Products of Tree Breeding*

See No. 2292.

232.2. Preparatory Work, Auxiliary Measures

See also Nos. 2194, 2475, 2490, 2611.

2425. Lindahl, R. R., and Lunt, A. L. **The effect of soil profile inversion on tree growth and soil properties.** *J. For.* 52 (2), 1954 (96–103). 33 refs.

Cuttings of Poplar and Pine were set in drums containing soil (*a*) in normal ABC profile sequence, (*b*) inverted CBA, (*c*) all top soil. Eight seasons' Poplar growth was twice in (*b*) and four times in (*c*) that of the control (*a*). White Pine showed less defined increases in (*b*) and even less in (*c*). Weed growth was much less on (*b*) and dry-season moisture was least in (*a*) and most in (*c*). Inversion caused physical and chemical changes in top and bottom horizons. It is concluded that it is not necessary and may not be desirable to have the most fertile soil layers at the surface.

2426. Kienitz, E., and Polster, H. Die Eignung der Hauptbodenarten des Landes Sachsen für den Waldfeldbau mit Waldstaudenroggen. [**The suitability of the chief soils of Saxony for agricultural intercropping with '*Waldstaudenroggen*' [a little-known variety of rye].**] *Arch. Forstw.* 1 (1/2), 1952 (23–30). [G.] [Institut für forstliche Wirtschaftlehre, Tharandt.]

Brief general notes on this small-grained biennial, 'forest rye' probably of Bohemian/Bavarian origin and long used in forest with field crops though practically passed over by agriculturists. A yield of 1000 kg. of grain and 2000 kg./ha. of straw has been reported. Notes follow on its soil requirements and advantages for intercropping with forest regeneration [cf. *For. Abstr.* 10 (No. 1761)] along with signs tabulated against each of the 17 symbols of Härtel's soil map of Saxony (1928) to indicate their suitability (5 degrees distinguished) for this rye. The same signs are set against 41 named forest localities in an outline map of Saxony.

232.3. Seed, Nursery Practice, Direct Sowing

232.31. *Seed*

232.311. Seed Production (Seed Years, Seed Crops; Seed Orchards and Methods of Inducing Seed Production)

See also Nos. 2280, 2330, 2338–9, 2396, 2423, 2472, 2544.

2427. Petrides, G. A., Parmalee, P., and Wood, J. E. **Acorn production in east Texas.** *J. Wildlife Mgmt.* 17 (3), 1953 (380–2). B.A.P.

Estimations of acorn crops of *Quercus stellata* (and in a few cases of *Q. marilandica* also) were made by counting the acorns on the first 25 twigs encountered on each tree. Average numbers were estimated and were correlated with d.b.h., height, and type of crown (narrow or spreading). The 3 years of the survey (1949–51) revealed marked differences in acorn production in general. The tallest trees, with the greatest d.b.h. and most spreading crowns gave the highest fruit yields.

2428. Dalke, P. D. **Yields of seeds and mast in second growth hardwood forest, southcentral Missouri.** *J. Wildlife Mgmt.* 17 (3), 1953 (378–80). 2 refs. B.A.P.

Summarizes data from collections made in 450–500 sample plots during 1938 and 1939.

232.312. Seed Collection, Extraction and Grading (including Seed Weight)

2429. Mergen, F., and Pomeroy, K. B. **Suggestions for better Slash Pine seed.** *For. Fmr.* 13 (5), 1954 (6–7, 15).

Recommends methods of choosing seed trees and collecting cones, and gives a list of equipment (ladders, climbing irons [cf. *For. Abstr.* 15 (No. 2570)], safety belts etc.) with names and addresses of manufacturers.

2430. Kaláb, J. Usnadnění výstupu trhačů lesních semen do korun stromů. [**Better methods of getting forest-seed collectors up to the tree crowns.**] *Lesn. Práce* 32 (12), 1953 (552–7). [Cz.]

Describes a new type of rope ladder consisting of Silon [Nylon?] ropes with duralumin rungs, the width of the ladder being 12 cm., and a hand-operated lifting device consisting of a drum, steel cable and a rope chair.

2431. Bat'a, M. Novy způsob vystřelování mezilanka Matouškovy trhačské soupravy. [**A new method of shooting the hauling-rope of the Matoušek rope ladder.**] *Lesn. Práce* 32 (6), 1953 (283–5). [Cz.]

[Cf. *For. Abstr.* 14 (No. 3282).] To improve both shooting accuracy and range, the author has designed a 90-g. 'projectile' which can be shot from any 16-bore shotgun and has a string attached to its nose.

2432. Kantor. Kdy sklízíme březové semeno. [**Time of harvesting Birch seeds.**] *Lesn. Práce* 32 (7), 1953 (306–8). [Cz.]

Seed should be collected from trees 20–60 years old, preferably with free crowns, and the seed quality tested before harvesting, using germinators, one of which is described. The seeds are best harvested between the time of ripening and the disintegration of the last catkin on the tree (roughly the whole of August in Czechoslovakia), but can be collected later.

2433. Šnajperk, R. Zkušenosti se sklizní semene lípy. [**Experience in harvesting Lime seeds.**] *Lesn. Práce* 32 (11), 1953 (499–503). [Cz.]

Harvesting begins in November, after the first frosts. The Czech collection rate is ca. 50 kg. seed/man-shift.

2434. Ny vingnötare för skogsfrö. [**A new de-winger for tree seeds.**] *Skogen* 41 (1), 1954 (21). [Sw.]

A new model of the apparatus already described [*For. Abstr.* 14 (No. 3284)] including a device for cleaning the de-winged seed.

2435. Šimák, M. Beziehungen zwischen Samengrösse und Samenanzahl in verschieden grossen Zapfen eines Baumes (*Pinus silvestris* L.). [**Relationship between seed size and seed number in cones of different sizes on an individual tree (*P. sylvestris*).**] *Medd. SkogsforsknInst., Stockh.* 43 (8), 1953. pp. 15. 10 refs. [G.g.e.sw.] Price *Kr.*1.

Two trees (71 and 76 cones from each) were examined. The results of measurements were statistically analysed and the following conclusions drawn: (1) Seed length increases with increasing cone weight; so does number of seeds/cone, but the number may vary considerably in cones of similar weight. (2) For a given size, cones with many seeds produce smaller seeds than those with fewer. (3) Seed size can be expressed as a function of cone weight and of the quotient cone weight/seed number.

2436. Jewesson, R. S., and Danyluk, W. **The comparative viability of seeds from different parts of the cones of interior Douglas Fir and Lodgepole Pine.** *Res. Note U.B.C. For. Club* No. 4, 1951. pp. 4.

Except in the extreme basal scales, all parts of the cones of interior Douglas Fir have the ability to produce viable seed. All scales bearing good seed tend to open at approximately the same time during the seed extraction process. The scales of the basal section of the Lodgepole Pine cone produce very little viable seed, most of the viable seed being produced in the upper section of the cone, which opens first during extraction. It is not, therefore, considered economic to attempt to open the scales of the basal section. *From authors' summary.*

232.314. Seed Purchase, Trade and Transport

2437. **List of [tree] seeds and suppliers according to letters received in reply to FAO letters of 6th and 8th October 1952 to forest departments and other forest agencies.** FAO, Rome. 1953. pp. 26.

Lists over 1000 species and indicates sources of seed supply (forest departments, research institutes etc.).

232.315. Seed Storage and Treatment

See also Nos. 2622–3.

2438. HATANO, K., and KANO, T. [**A brief report on the after-ripening of seeds of *Ginkgo biloba*.**] *J. Jap. For. Soc.* 34 (12), 1952 (369–70). 6 refs. [Jap.e.]

In seeds of *G. biloba* collected on 1 Oct. and kept at room temperature, embryo growth continued until Jan., but there was no further growth in seeds kept at 5° C. All seeds kept either at room temperature or at 5° germinated in 6 weeks, but the former germinated more rapidly during the first 4 weeks. *From authors' summary.*

2439. KRAHL-URBAN, J. Überwinterungsversuche mit Eicheln und Bucheln. [**Winter storage experiments with acorns and Beech mast.**] *Forstarchiv* 23 (7), 1952 (136–40). 22 refs. [G.]

Conclusions from 2 series of winter-storage trials with *Quercus sessiliflora* acorns in 1948–49 and 1949–50 are that the following may be recommended as satisfactory: (1) In the open: (*a*) on bare, permeable soil, acorns heaped ca. 20 cm. high and covered with leaves or Spruce brushwood; (*b*) if coarse sand or gravel mixed with earth, acorns heaped 30 cm. high, otherwise as (*a*); (*c*) storage in a clamp similar to that used for potatoes. (2) Indoors: (*a*) acorns mixed with sand and stored on a cement or stone floor in any airy cellar; (*b*) unmixed, or with peat litter, in cellars with a constant temperature of 2–3° C. and humidity ca. 90%; (*c*) mixed with sand and stored in a shed. (3) Only where regular inspection and any necessary adjustment of temperature, humidity and moisture of acorns can be made: (*a*) unmixed with sand, on stone or cement floor in airy cellars; (*b*) ditto, in a shed. Storage indoors is preferable, if possible, in order to avoid extremes of weather, damage by rodents etc., and to facilitate inspection.

Results from a single winter's experimental storage of Beech mast were very unsatisfactory, probably owing to its low moisture content at the beginning of storage. Mice also spoilt one of the lots. So far as results go, storage in a cellar was the most successful, especially when the mast was mixed with sand.

2440. BIBBY, K. M. **The effect of various overwinter storage conditions on *Nothofagus menziesii*.** *For. Res. Notes N.Z. For. Serv.* 1 (7), 1953 (29–33).

Storage in sealed containers at 2–5° C. in no way reduced viability, and it eliminated the need of cold pre-treatment to obtain maximum germination. Stratification was a satisfactory means of retaining viability, but involved the risk of premature sprouting. [Cf. *For. Abstr.* 15 (No. 2447).]

2441. NORDSTRÖM, L. **A method of stimulating the germination of Pine seed (*Pinus sylvestris*).** *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953 (91–108). 9 refs. [E.e.sw.]

Germination was considerably increased by treating the seed with sunlight or ultraviolet light; but not where the seed had been seriously damaged in de-winging. [Cf. *For. Abstr.* 14 (No. 3292).]

2442. BIBBY, K. M. **Experiments in pre-germination treatment of tree seed.** *For. Res. Notes N.Z. For. Serv.* 1 (7), 1953 (9–16). 1 ref.

Pre-chilling in moist conditions before germination greatly improved rate and amount of germination in *Pinus strobus*, and to a less degree *Pseudotsuga taxifolia*. Pre-treatment of *Pinus radiata* was of little value.

2443. PETERSON, R. A. **Comparative effect of seed treatments upon seedling emergence in seven browse species.** *Ecology* 34 (4), 1953 (778–85).

Stratification, hot-water soaking, and scarification were tested on seed of *Cornus stolonifera*, *Purshia tridentata*, *Ceanothus sanguineus*, *C. velutinus*, *Amelanchier alnifolia*, *Prunus demissa* and *Acer glabrum*. Results are tabulated.

232.318. Seed Testing. Germination Tests. Seed Quality.

2444. **International rules for seed testing adopted by the meeting of the International Seed Testing Association in Dublin on May 29th, 1953.** *Proceedings of the International Seed Testing Association, Copenhagen* 18 (1), 1953. pp. 69 + 2 forms. [E.]

The rules come into force on 1 Jan. 1954 for the Southern and on 1 July 1954 for the Northern Hemisphere.

2445. FAVILLI, R. Sull'impiego dei sali de tetrazolio per la determinazione rapida della germinabilità dei semi. [**The use of tetrazolium salts for rapid germination testing of seed.**] *Annali della Facoltà di Agraria, Pisa* (*n.s.*) 11, 1950 (57–84 + 2 plates). 119 refs. [It.it.f.e.] C.G.B.

A full review of the literature with an account of the author's own experiments. These were conducted for the most part on agricultural species, but satisfactory results were obtained with *Pinus pinea*.

2446. VIDEIRA, J. LOURENÇO. Os ensaios colorimétricos na determinação do poder germinativo das sementes florestais. [**Colorimetric tests for determining the germinative capacity of forest seeds.**] *Estud. Inform. Serv. flor. aqüíc. Portugal* No. 13–C3, 1953. pp. 18. 6 refs. [Port.port.e.] Limited distribution.

Reviews the history and methods of seed testing, with particular reference to staining, and presents the results of tests (1) with indigo carmine on *Pinus pinaster* and (2) to find the best concentration of indigo-carmine solution for *P. pinea*; this proved to be 1/400.

2447. BIBBY, K. M. **Laboratory germination tests of *Nothofagus* seed.** *For. Res. Notes N.Z. For. Serv.* 1 (7), 1953 (1–8).

Seed of 3 species was germinated under various conditions in order to find the optimum conditions for laboratory testing. A temperature of 22 or 26° C. at night in a Copenhagen germinator proved

most satisfactory. For maximum germination, *N. fusca* and *N. menziesii* required pre-chilling (3–5° C.) in moist conditions for 30–60 days. *N. cliffortioides* needed 90 days' pre-treatment. [Cf. *For. Abstr.* 15 (No. 2440).]

2448. Clifford, H. T. **A note on the germination of *Eucalyptus* seed.** *Aust. For.* 17 (1), 1953 (17–20).

Tests were made to determine light requirements and it was shown that light is not required for germination of mature seed of most Victorian species. *Eucalyptus regnans* and *E. behriana*, however, required light for germination of both mature and immature seed, and *E. rostrata*, *E. nitens*, *E. sieberiana* and *E. umbellata* for immature, but not for mature seed.

2449. Magini, E. L'influenza dell' età della pianta madre sulla qualità del seme di abete bianco. [**Influence of age of mother tree on seed quality in *Abies alba*.**] *Ital. for. mont.* 8 (6), 1953 (287–92). 10 refs. [It.it.f.]

Statistical analysis of results of tests on seed of Tuscan provenance showed that trees of less than 40 years produced poor seed, and those of 100–150 years often produced good but sometimes poor seed. It is therefore advisable to choose trees between 40 and 100 years as seed trees.

232.32. *Plant Rearing. Nursery Practice*

See also No. 2325.

232.322. Preparation and Treatment of Soil, including Maintenance of Fertility

See also Nos. 2943–5.

2450. Youngberg, C. T., and Austin, R. C. **Fertility standards for raising Douglas-Fir in forest nurseries.** *J. For.* 52 (1), 1954 (4–6). 14 refs.

On the basis of 54 soil samples from productive Douglas Fir stands in Oregon and Washington where pH was 4·8–5·8, total N 0·23%, available P and K 82 and 198 lb./acre, with Ca and Mg 4·65 and 1·79 m.e./100g., the standard recommended for nursery nutrition is pH 5·3, N 40, P 80, K 200 available lb./acre with exchangeable Ca and Mg at 2000 and 450 lb./acre. Nutrition level is similar to that for Eastern [White] Pine and the NPK ratio, 1/2/5, similar to that required by other conifers. The immediate use of this standard instead of those based on agricultural crop requirements is recommended, particularly for associates of Douglas Fir (e.g. Noble Fir, Sitka Spruce, Redwood).

232.323. Sowing and Covering

2451. Richtar, B. Vliv způsobu síje na množství vypěstěných semenáčků u borovice obecné (*Pinus sylvestris* L.). [**Influence of the method of sowing on the % survival of *P. sylvestris* seedlings in the nursery.**] *Lesn. Práce* 32 (12), 1953 (540–4). [Cz.]

Three thousand seeds (laboratory-tested germination 62·5%) were sown on each of 6 test plots: in three, the seeds were sown in pressed drills and (1) covered with the rather heavy nursery soil, (2) covered with humus, and (3) covered with humus and moderately pressed, while the other three (1*a*, 2*a*, 3*a*) were in addition covered for a fortnight with cleft billets of wood. The survival % and shoot and root length measurements after 1, 2 and 5 months showed that, 1 and 1*a* gave the poorest results, and 3 and particularly 3*a*, the highest survival rate (for 3*a*, 60·3% of the germinated seeds after 5 months) and greatest shoot length.

232.324. Transplanting and Lining Out, including Grading of Seedlings

2452. Soster, P. Considerazioni economiche circa i trapianti nei vivai forestale. [**The economics of transplanting in forest nurseries.**] *Monti e Boschi* 5 (2), 1954 (68–74). [It.f.e.]

Discusses costs of transplanting with particular reference to a tool [illustrated] devised for the purpose of making planting holes. It consists of 10 spikes attached to a footplate and two handles, the distance between the spikes being adjustable.

232.325. Tending (in both Seedbeds and Transplant Beds)

See also No. 2614.

2453. Schwalen, H. C., Frost, K. R., and Hinz, W. W. **Sprinkler irrigation.** *Univ. Ariz. Bull.* No. 250, 1953. pp. 41.

Describes types of sprinkler systems, planning, and costs.

2454. Bibby, K. M. **Control of weeds in conifer nurseries by weedicides.** *For. Res. Notes N.Z. For. Serv.* 1 (7), 1953 (17–28).

$ZnSO_4$ as a pre-emergence spray gave excellent control of weeds in seedbeds but killed 40% of *Pinus radiata* seedlings; *Pseudotsuga taxifolia* was unaffected. H_2SO_4 reduced weeds by 90% and did no harm to tree seedlings. Shell White Spirit and Vacuum Weedicide P reduced weeds by 90% and caused only minor damage to Pine.

2455. **Two pre-emergence herbicides prove effective.** *Carib. For.* 14 (1/2), 1953 (22–3, 53–4). [E.Span.] (*Rep. U.S. trop. For. Exp. Sta.* 13, [1952?].)

TCA at 20 lb./acre and Na pentachlorophenate at 15 and 30 lb./acre applied to *Swietenia macrophylla* one week after sowing kept nursery beds sufficiently clean for 8 weeks. These pre-emergence treatments are superior to pre-sowing treatments. [Cf. *For. Abstr.* 14 (No. 291).]

232.327. Protection Measures in Nurseries

See also No. 2705.

2456. [**A foliage disease of White Pine seedlings.**] *Rep. Del. St. For. Dep. 1952/53*, 1953 (21).

Cylindrocladium scoparium, usually a saprophyte, has caused much damage to the foliage of *Pinus strobus* seedlings in the nursery. Manzate, Fermate, and Bordeaux mixture all gave satisfactory control without injuring the foliage. Mercurial compounds did injure foliage and have been rejected.

232.328. Vegetative Propagation

See also No. 2325.

2457. SKINNER, H. T. **Propagation of Oaks.** *Amer. Nurserym.* 98 (10), 1953 (12, 63–9).

A review of progress to date in propagating Oaks (especially American species) by cuttings, budding, layering, and grafting.

2458. BORISENKO, T. T. Ukorenjaemostj listjev duba. **[The rooting capacity of Oak leaves.]** *Priroda, Moskva* 42 (6), 1953 (99–100). 2 refs. [Russ.] A.P.B.

Reports rooting, but no shoot formation, in leaf cuttings treated similarly to those dealt with in a previous paper [cf. *For. Abstr.* 14 (No. 3326)] but cut off at the point of insertion of the petiole on the branch, i.e. with no heel of wood.

2459. WELLS, J. S. (1) **Outdoor propagation [by cuttings] under constant mist.** (2) **Further notes on constant mist.** *Amer. Nurserym.* 97 (11), 1953 (14, 51–8); 98 (11), 1953 (12–3, 62–7).

Deals mainly with propagation of ornamental shrubs, including a dwarf variety of *Thuja orientalis.*

2460. MORISHITA, G., and OYAMA, N. **[Substances in cuttings that inhibit rooting. (II) A substance in sawdust that inhibits rooting, and its elimination.]** *J. Jap. For. Soc.* 34 (12), 1952 (382–6). 7 refs. [Jap.jap.e.]

Cuttings of *Amorpha fruticosa* failed to root in sawdust of *Castanea crenata* and the vessels at the end of the cuttings were found to be clogged with a tannin-like substance. The sawdust proved to contain a water-soluble root-inhibiting substance, with a tendency to oxidize, believed to be similar to tannic acid. Various treatments, especially in boiling or lukewarm water, removed the substance. *From authors' summary.*

2461 DORAN, W. L. **The vegetative propagation of *Ginkgo*.** *J. For.* 52 (3), 1954 (176–7). 5 refs.

Stem cuttings of *Ginkgo biloba* made from growth of the current year, rooted well if taken in mid-June. Cuttings from the apical half of a shoot rooted well without treatment; those from the basal half rooted better if treated with indolebutyric acid. Cuttings taken in late July rooted much less well.

2462. MACHADO, D. PEREIRA. Sobre o melhoramento do pinheiro bravo no sentido de obter árvores de elevada capacidade de produção de gema para a constituição dos futuros povoamentos. I. Propagação vegetativa, suas possibilidades. **[The improvement of *Pinus pinaster* in order to obtain high-resin-producing trees for future stands. I. Vegetative propagation.]** *Estud. Inform. Serv. flor. aqüic. Portugal* No. 5–C3, 1953. pp. 23 + 1 tbl. + 6 photos. 41 refs. [Port.] Limited distribution.

Preliminary trials in rooting cuttings. Greatest success was obtained with 2% traumatic acid in lanoline paste.

2463. SATOO, T., NEGISI, K., and NAKAMURA, K. **[Relations between rooting and the age of the tree from which cuttings are taken. An experiment using clonal material [of *Cryptomeria japonica*].]** *J. Jap. For. Soc.* 35 (3), 1953 (69–70). 14 refs. [Jap.e.]

Rooting of cuttings from two clones decreased with increasing age of the tree, but the other two clones showed no significant difference in rooting with age. Rooting % was higher for cuttings from adventitious than from ordinary branches on the same tree. *From authors' summary.*

2464. KOTARI, K. **[The separate and combined effects of time of planting, density of cuttings and the period of watering on young Sugi [*Cryptomeria japonica*].]** *J. Jap. For. Soc.* 35 (9), 1953 (277–81). [Jap.jap.e.]

The following factors were studied: density (number) of cuttings [75, 100, 133, 166]/sq. m.; watering period [0, 1, 2 or 3, months]; and time of taking the cutting [four dates in March and April]. The effect of the different factors was determined from the % of sound plants, root weight and height growth. A statistical analysis of the [tabulated] results showed:—(1) The time of taking the cutting was the chief factor; (2) 100 cuttings/sq. m. gave the best results for spacing; (3) watering seemed to have less effect than the other climatic factors during the period of the experiment; and (4) a plant % of 100 resulted from taking cuttings on 13 March, planting at 100/sq. m. and watering for 1 month. *From author's summary.*

2465. SATOO, T., and HUKUHARA, N. **[Water relations of cuttings shortly after planting.]** *Bull. Tokyo Univ. For.* No. 45, 1953 (89–101). 5 refs. [Jap.e.]

Leaf-bundle cuttings of *Pinus densiflora* [cf. *For. Abstr.* 14 (No. 3328)] and stem cuttings of *Cryptomeria japonica* and *Euonymus japonicus* were studied. The transpiration rate of the cuttings was found to be very high the day after planting as compared with seedlings (*P. densiflora*) or rooted cuttings (the other 2 species), decreasing gradually until, about a week after planting, it reached a stable rate rather below that of the controls. The daily transpiration of newly-planted cuttings of *E. japonicus* differed considerably from rooted controls during the first few days, being very high during the morning and falling rapidly during the afternoon, while transpiration of the controls followed a normal pattern [rising slowly to a peak about midday or after and then falling]. After about a week the new cuttings followed the normal pattern but at a significantly lower level. Change in the stomatal apertures for the cuttings showed curves similar to those for transpiration. [Results are given in graphs and tables with English legends.] *From authors' summary.*

2466. HYODO, M. **[Propagation of *Edgeworthia papyrifera* (Kochi strain) by stem cuttings placed horizontally in the medium. I. Experiments on treatment with a growth regulator (1).]** *J. Jap. For. Soc.* 35 (10), 1953 (312–3). 1 ref. [Jap.jap.e.]

Propagation during the rainy season was successful; treatment with e.g. Rootone before setting had no effect on the rooting %.

2467. TAKAGI, T. **Effects of external H-ion concentration on rooting responses of Poplar stem cuttings in nutrient solutions.** *J. Jap. For. Soc.* 35 (10), 1953 (309–12). 6 refs. [E.e.jap.]

Cuttings of *Populus alba*, *P. monilifera*, and *P. simonii* were used in experiments to study the effect

of pH, ranging from 2·4 to 11·4, of Sach's nutrient solution, and of a 24-hr. basal dip in β-indolylacetic acid (IAA, as K salt) on rooting and on the *K* ratio ($K = R/G \times 100$ where *R* is dry weight of adventitious roots and *G* dry weight of established cuttings). The following results were obtained: (1) pH values giving max. rooting % for both untreated and treated cuttings ranged from 6 to 9·6, *P. alba* and *P. monilifera* rooting best at pH 7·8, *P. simonii* at 6·0. (2) At all pH values, rooting % was greatly increased by IAA treatment. (3) pH giving max. value of *K* for both treated and untreated cuttings ranged from 6·0 to 7·8. *K* for *P. alba* and *P. monilifera* was highest at pH 7·8 and for *P. simonii* at 6·0, whether treated or not. (4) At all pH values *K* was increased by treatment.

2468. Floor, J. Proeven met vermeerdering door entstekken. [**Trials of propagating by 'X cuttings' [cuttings assisted in the rooting period by side-grafting to cuttings of easy rooters**].] *Mededeling, Instituut voor de Veredeling van Tuinbouwgewassen, Wageningen* No. 40, 1952. pp. 26. 11 refs. [Du.e.]

Experiments were made on propagating a number of species and varieties, including Apples, Pears, *Populus tremula* and *P. lasiocarpa*, that do not root easily. Cuttings were taken in December and heeled in until the end of February when cuttings of shy and ready rooters were combined by side approach grafting (such being here called 'X cuttings'). In 1950, cuttings of both *P. lasiocarpa* and *P. tremula* were so grafted to those of *P. nigra* var. *italica*. By Nov. 1950, 8 of the 19 X cuttings of *P. lasiocarpa* and 23 of the 29 of *P. tremula* were rooted. In 1951, X cuttings of *P. tremula*, using 1- and 2-year material, were made with *P. nigra* var. *italica* and shoot cuttings of *P. tremula* were also grafted on roots of *P. nigra* var. *italica*. Results are tabulated and show that the second method, which is more practicable commercially, also gives good results. The value of these methods for studies of scion/stock incompatability and of the factors governing rooting of cuttings is discussed. [Cf. *For. Abstr.* 13 (No. 1161).]

2469. Hyodo, M. [**Root cuttings of *Robinia pseudoacacia* var. *bessoniana***.] *J. Jap. For. Soc.* 35 (9), 1953 (289–91). 3 refs. [Jap.e.]

Only insignificant differences were found between rooting and development of cuttings (1) inserted in the soil at an angle or set horizontally at a depth of 3 cm. and (2) treated with α-naphthalene-acetic acid or with Rootone for 12 hours.

2470. Rubcov, N. I. O razmnozenii eli otvodkami. [**Propagation of Norway Spruce by layering**.] *Bot. Ž.* 37 (5), 1952 (685–7). [Russ.russ.] C.G.B.

In August 1948, in a nursery in Gorki Province, 192 branches of a Norway Spruce hedge were layered, being either strangulated with wire, partially ring-barked, or undercut transversely to half their diameter at the portion bent for insertion into the soil. The branches were 4–8 years old and 0·5–1·6 cm. in diam. at the bend. Inspection 1 year later showed that 73% of the undercut layers, 58% of those strangulated, 14·6% of those partially ring-barked, and 40% of the controls (no external mechanical injury) had rooted. Variants of each treatment in which 1 or 2% hetero-auxin was applied in vaseline to the bent portion, showed no increase in the number of rooted layers.

2471. McNitt, V. J. **Plastic wigwam aids in outdoor propagation**. *Amer. Nurserym.* 97 (12), 1953 (10, 28–30).

The use of this device, essentially a sleeve of transparent plastic material with a metal ring at the lower edge, which is pressed into the soil, and a drawthread at the top, which is pulled up and secured to a stake or to the top of the stock, greatly facilitates grafting. The stocks grow normally in nursery rows and do not suffer the checks and stunting incidental to the use of potted plants in the greenhouse.

2472. Bánó, I. Tapasztalataink a fenyömagtermelö ültetvények létesítése terén. [**Our experience in the setting up of coniferous tree seed orchards.**] *Erdö* 1 (1), 1952 (57–65, 96, 99–100). [Hung.russ.e.]

The aim of establishing these is to improve forest stock and to ensure a supply of good seed at the right time and at lower cost. The first grafting experiments in 1951 were unsuccessful. The conifer seedlings [to be used as rootstocks] were not potted up till the end of March. This is usually done in the previous August, so that the seedlings potted to receive the grafts can be put in the heated glasshouse at the end of December or beginning of January. Growth then begins within 4–5 weeks, so that grafting can be done during February. The scions are then completely dormant, and can be used soon after collection. Because of the late potting in 1951, growth of the rootstocks was delayed till the second half of April. No previous experience of storing the scions was available; a small icehouse was built and scions gathered on 6 April were stored there successfully: scions stored thus for 3–4 weeks were not inferior to freshly gathered ones. This led to the idea of attempting to make grafts in the open, since April is the normal time for outdoor growth.

On the Kámon estate 368 seedlings [age?] of *Pinus sylvestris* were potted on 24 and 25 March (1951), and of these 100 were grafted on 9 April and the rest on 3 and 4 May. The scions were taken from selected trees in the Pornópát and Szentpéterfa forests; unfortunately these trees were not marked at the time, and cannot now be identified. Only 73 grafts succeeded. These were put out in the open in June, the pots being plunged in the soil. By autumn, 51 had survived, and these were planted out in the Kámon nursery in Oct. The ground was fenced against animal damage; there was a slight weight of snow on the seedlings in the spring. To date 47 have survived (13% of the original total); and these were growing well in spring 1952, when, incidentally, they flowered well. This is interesting because there was also extensive flowering in the Vas county of *P. sylvestris* in spring 1952.

For the open-air graftings 2-year-old *P. sylvestris* seedlings from the Ják nursery were used. They were covered with glass to hasten growth for two weeks from 3 March. Grafting (401 grafts) was done on 20 April and results were good; but all succumbed to attacks from *Pissodes notatus*. It is interesting that the surrounding forest did not suffer

then nor had it previously, which suggests that the pest was attracted by the resinous scent of the grafts. The experiment of outdoor grafting was continued, 20 grafts being made in May and August, of which some were successful. To date 3 outdoor grafts have survived. Thus no conclusions can be drawn as yet, but the principle of outdoor grafting is regarded as important.

For the 1952 graftings, seedlings for potting were selected in summer 1951, 2-year-old *P. sylvestris* seedlings being taken from Magágy. These had the advantage over nursery-raised seedlings of clean, straight stems. The most suitable are 5–6 mm. diam. at the point of grafting, which may be 5–10 cm. above the root collar, though this is not essential. Between potting and grafting the stem diam. will increase to 6–8 mm. Potting was scheduled for early August, but owing to drought it had to be delayed till the 28th. The drought that same autumn stopped practically all further growth in the *P. sylvestris* seedlings, although potted Spruce grew well enough and even began to outrun the pots. The conclusion is that *P. sylvestris* cannot be potted in August without hazard. Seedlings for use as stock plants in Feb./March 1953 were therefore potted in April/May 1952. Again the choice was 2-year-olds from Magágy, but thinner stems were selected. In future, however, it is intended to use 3-year-old stock. The soil mixture used at present is 6 parts garden soil, 2 parts sand and 2 parts compost. After potting, the plants must be plunged to prevent drying out and straw used against frost, as the pots are to be lifted at the turn of the year.

The selection of trees to provide the scions is important, and the choice fell on Szentpéterfa because of the excellence and relative maturity of the natural *P. sylvestris* stands there, growing, moreover, on a compacted clay soil similar to that of the Vas county areas that are to be planted. Fifty outstanding trees aged about 100 years were selected and marked, in a pure stand of *P. sylvestris* of ca. 80% density. Though pure, the stand had clean stems to a height of 15–20 cm.; total height averaged ca. 30 m. The trees were of various types, ranging from the lightly forked, thin-barked, acutely branched, open-crowned types to those resembling *P. pinea*. The quick but rather damaging Wolfgang climbing gear and the slow but innocuous Pojtinger were both used in collection. Scions about 15–20 cm. long are collected from the upper and middle parts of the crown. Grafting can begin when the stock shows 2–3 cm. of fresh growth. The numbers of graftings made in the glass houses at Sárvár and Kámon in 1952 are:

6667	*Pinus sylvestris*	successes to date,	ca. 80%
149	*Pinus pinaster*	,, ,,	90%
63	*Pinus rigida*	,, ,,	65%
216	Spruce	,, ,,	90%
505	*Picea omorika*	,, ,,	75%
405	Larch	,, ,,	40%

The graft is expected to take in 3–4 weeks, and the new growth of the rootstock is continually pinched out. Hitherto the whole of the rootstock above the graft has been left until the spring following the grafting. This year, since the scion has had sufficient foliage for assimilation, an experiment has been made with the complete removal of the upper part of the stock immediately after grafting. The results promise well. At the end of May the pots are plunged in the open. The intention is to plant out these grafts at one year in the plantation. For this foreign data are not available. It is possible to plant out in spring, autumn or possibly even in August.

It is coming to be generally accepted that a seed plantation yields at 5–6 years. A graft may, of course, yield in its first year; what is uncertain is when it will begin to give an economic return.

The establishment of seed plantations opens up the possibility of increasing the numbers of foreign species in Hungary, e.g. Douglas Fir, which on such varied sites as the sandy soil of Zákány, the loam of Telekes, and the clay Jáplánpuszta, outgrows neighbouring stands of Spruce and *Pinus sylvestris*. Douglas Fir seed is not to be expected from abroad.

232.329. Miscellaneous (including Greenhouses, Frames, Raising in Pots, Tubes etc.)

2473. Seymour, W. **Some Austrian forestry methods**. *Quart. J. For.* 48 (1), 1954 (29–33).

Includes notes on afforestation of high mountain slopes with European Larch. Planting stock is usually 1 + 2 year in wooden tubes or boxes. The boxes are about the size and shape of a pencil case, opening down one side; they are planted out with the young Larch in them.

232.33. *Formation of Stands by Direct Sowing*

See also No. 2492.

2474. Callin, G. Om tidsåtgången vid sådd av skogsfrö. **[Time spent in sowing forest tree seed.]** *Medd. SkogsforsknInst., Stockh.* 43 (7), 1953. pp. 43. 2 refs. [Sw.e.] Price *Kr.*2.

A study was made on times spent (1) on hoeing small, medium or large squares or strips of the same area, on burnt or unburnt sites and on sites with different degrees of difficulty as regards occurrence of bushes, stumps, roots and stones, thickness of the humus layer, and quantities of grass and moss; (2) in clearing varying amounts of tops and branches; (3) in deep cultivation; (4) in walking between plots; and (5) in the actual sowing and covering. Results are shown in tables with English legends. Basic rates are given for piece work in hoeing squares or strips on burnt sites with the adjustments necessary for unburnt and for especially difficult sites. A comparison between costs of hoeing squares and strips shows that although the time spent on the latter is longer, the cost/ha. is roughly the same for both, only half as many strips as squares being needed to give the same final spacing between plants.

2475. Pobedinsky, A. **Seeding of cutovers and mechanical logging**. *For. Chron.* 29 (3), 1953 (290–1). Translated from *Lesnoe Hozjaistvo*, May 1953, by A. Koroleff.

Describes a method of direct sowing of cut-over areas making use of the disturbance of the soil by mechanical skidding, and sowing in seed spots of 12 × 20, 20 × 20 or 40 × 40 in., allowing 50–100 seeds to each spot.

2476. Shaw, E. W. **Direct [aerial] seeding experiment on the 1951 Forks burn.** *Res. Pap. Pacif. Nthwest. For. Range Exp. Sta.* No. 9, 1953. pp. 19.

An investigation was made on a 40-acre study area in a burnt area within the Olympic National Forest sown by helicopter with a mixture of seeds of *Picea sitchensis*, *Pseudotsuga taxifolia*, *Tsuga heterophylla* and *Chamaecyparis lawsoniana*. An attempt to study the seed distribution by species failed because of the effect of the cold weather at the time of sowing on the fly-paper used to trap the seeds. One year after sowing, 45% of the milliacre plots were stocked (i.e. contained one or more live seedlings). Seedling survival by species during the first year was *P. taxifolia* 45%, *T. heterophylla* 32%, *P. sitchensis* 18% and *C. lawsoniana* 16%. Some suggestions for improving methods of studying the effectiveness of direct sowing are made.

232.4. Formation of Stands by Planting

232.41. *Planting Stock (Type, Handling and Treatment)*

See also Nos. 2473, 2656, 2705.

2477. Kędzierski, Z. Próba ustalenia norm na materiał sadzonkowy. **[Tentative standards for planting stock.]** *Sylwan* 97 (5), 1953 (361–6). [Pol.]

One-year plants of *Pinus sylvestris* and *Quercus robur*, supplied as representative samples by ca. 20 forest districts throughout Poland (ca. 500 plants from each place, totalling 10,000 Pine and 8,000 Oak plants) were accurately measured, carefully described, and statistically analysed. It was found that plants of the 2nd class, representing ca. 50% of all plants for either species, had the following characteristics: Pine (unbranched or with one branch) shoot length 8 ± 2 cm.; root length 20 ± 10 cm.; root collar diam. 1·5 ± 0·5 mm. The respective figures for Oak (unbranched or with one branch) were: 16 ± 3 cm.; 29 ± 10 cm., and 4 ± 2 mm.

2478. Ruth, R. H. **Survival and growth of fresh and stored planting stock.** *Res. Note Pacif. Nthwest. For. Range Exp. Sta.* No. 93, 1953. pp. 2.

A total of 2387 Douglas-Fir and *Chamaecyparis lawsoniana* seedlings, half directly lifted from the nursery and half stored in a cold room for 2 months before planting, were put out in 1943. No significant differences in survival and height in the 10th growing season were found between the two methods: but Douglas Fir survived better than *C. lawsoniana* and was by then almost 4 times as tall.

232.43. *Spacing and Arrangement in Plantations*

See Nos. 2407, 2530.

233. *Afforestation*

See also Nos. 2380, 2403, 2473, 2518.

2479. Brown, J. M. **Soil profile characters and natural vegetation as guides to the choice of species for wasteland afforestation.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 21 (No. 3), 1953. pp. 21. 20 refs. [E.e.] [Forestry Commission, Farnham.] Limited distribution.

Discusses various factors (e.g. climate, topography, soil) used in choosing species for wasteland afforestation and in particular the value of a study of both soil and natural vegetation, quoting examples from Norway, Holland, New Zealand and, in more detail, from Great Britain.

2480. Javorka, S. A növényföldrajz az erdészet szolgálatában. **[Plant geography in the service of forestry.]** *Erdö* 1 (1), 1952 (3–8, 93, 97). [Hung. russ.g.]

The writer describes the vegetation etc., of two characteristic areas of Hungary: (1) The central uplands from Keszthely to the Sátor hills and Torna karst, of which he concludes: for afforesting these dolomitic slopes *Pinus nigra* remains indispensable, although flowering Ash [*F. ornus*?] and pubescent Oak [*Q. pubescens*?] can also be planted successfully and continue to be useful, at any rate until they can be replaced by more valuable species; on the bleakest slopes it would be useful to grow more *Cotinus coggygria* (acclimatized especially on the Vertes and Bakony mountains), which was formerly an important export (Magyar sumach) and still has economic value. (2) The uplands of Vas and Sopron counties at the foot of the eastern Alps, of which he concludes: in N.E., W. and S.W. Transdanubia, *Pinus sylvestris* is likely to succeed, but on the Alföld, with its limy soil, *Pinus nigra* is ultimately more reliable.

2481. Járó, Z. A hullámtérfásitás talajadottságai. **[Soil requirements for afforestation of flood areas.]** *Erdö* 1 (1), 1952 (80–5). [Hung.]

The general conditions of these areas are described, with particular reference to the Danube and Tisza. Danube deposits may contain up to 50% $CaCO_3$, with variable particle size, and depths up to 8 m. The Tisza deposits are acid except at its confluence with the Maros. Research has established that extensive areas of floodplain are suited to the Poplar hybrids and *Quercus robur*, the former preferring rich, moist loams with a water-table at least 3–4 m. below the surface. Major physical and chemical characteristics of the soil of one of the finest 'Canadian' Poplar stands in Hungary are discussed and tabulated for each 20 cm. layer down to 200 cm.; individual growth has reached 80 cm. diam. and 32m. height in 42 years. Similar soil data are presented for a meadow clay soil on the Köros river at Gyulavári—a black, not very water-retentive soil, rich in nutrients but entirely free from $CaCO_3$—which carries an Oak stand of exceptional growth. Various soil factors limiting the use of these desirable species are also discussed and exemplified in tables. The generally high $CaCO_3$ content of Danube flood soils, even where the Na-salt content is as low as 0·11%, is unfavourable to hybrid Poplar, which must give way to the indigenous species; similarly on compacted clay soils and those of high alkalinity where Oak is the obvious alternative. Intercalary strata of coarse, loose gravel, common at 50- to 90-cm. depth, also preclude hybrid Poplar and if such strata are well developed, with a light topsoil, only Scots or Austrian Pine should be planted.

2482. Babos, I. A hullámterek fásítása. **[Afforestation of floodlands.]** *Erdö* 1 (1), 1952 (16–32, 94–5, 98). 6 refs. [Hung.russ.f.]

In a general introductory survey of Hungarian forestry problems, the author glances at two key ones: the planting of conifers and the afforestation of floodlands with fast-growing species, in particular Poplar [cf. *For. Abstr.* 15 (No. 3122)]. The existing areas of superior Poplar spp., are tabulated by forestry district and 10-year age classes, along with the areas planned for the future (all in *holds*). The flood characteristics of the main rivers, in particular the Tisza are presented in some detail, including rates of deposition. The Tisza's lime content (average 37·5 g./cu.m.) is considered important for Poplar cultivation; it deposits 48–105 kg./ha. of plant nutrient per year. The afforestation of flood areas—the protective and drainage works of which are described—forms part of an integrated land-use plan, involving ca. 56,300 ha. of protective belts, 55% of which will be along the Tisza; regional details are given in tables. The importance of Poplar species to the plan—they were formerly eliminated in the mountains as worthless—is stressed, particularly two varieties of 'Canadian' [hybrid Black] Poplar, along with *Salix* sp., *Robinia pseudoacacia, Fraxinus excelsior* and *Juglans nigra.* On poor, alkaline, compacted or clayey soils, *Quercus robur* should be the main species; on the higher sandy soils, *Pinus sylvestris* and *P. nigra.* Interplantings, chiefly of *Tilia* and *Acer* spp. and of *Viburnum* and *Cornus* spp. are also contemplated. The plan lays down 7 main types of stand, with their proportions by area (conifers constituting only 2%) and their spacing. After giving forecasts of outturn, according to anticipated methods of management (rotations: Poplar 40, Willow and Robinia 30, other species 60 years) the writer lays down the principles on which a choice between forestry and agricultural use should be made and gives in a table the relative values/ha. of timber and wheat.

2483. Limstrom, G. A. **A bibliography of strip-mine reclamation.** *Misc. Release Cent. St. For. Exp. Sta.* No. 8, 1953. pp. 25.

Contains 248 references to publications, mainly American, of direct or indirect interest.

2484. Thaarup, P. Klitplantagerne 100 år efter plantningens begyndelse. **[The dune plantations 100 years after planting began.]** J. H. Schultz, Universitets-bogtrykkeri A/S, København. 1953. pp. 96. [Dan.]

Outlines the history of State planting on the sand dunes of W. Jutland, and discusses the value of the plantations and their extent to-day, with notes on the different species used, climatic data and some figures for costs.

2485. Leone, G. **Origin and reclamation of the dunes in Tripolitania.** In *Desert Research*, Research Council of Israel, Jerusalem, 1952 (401–3).

After long experiment it was found that small hedges of *Imperata cylindrica*, dividing the area into a chessboard pattern, was an efficient method of sand fixation, followed by the planting of Australian Acacias (particularly *A. saligna* and *A. cyanophylla*), and later by more valuable species such as *Cupressus* spp., *Pinus* spp., and *Eucalyptus* spp. [Cf. *For. Abstr.* 8 (No. 73).]

2486. Métro, A. Techniques de fixation et de mise en valeur des dunes du littoral atlantique marocain. **[Techniques for the fixation and reclamation of sand dunes on the Atlantic coast of Morocco.]** *Ann. Rech. for. Maroc 1952*, 1953 (1–49 + 12 photos + 1 map). 15 refs. [F.]

Experience has shown that tree species should be sown or planted at the same time as the sand is mechanically fixed by thatching. It is much more difficult to establish them on stabilized dunes already covered with vegetation. Notes are given on species successfully used in Morocco, notably *Acacia* and *Eucalyptus* spp., *Retama monosperma, Pistacia lentiscus* and *Pinus halepensis.*

2487. Matjuk, I. S. K obleseniju peskov Tersko-Kumskoĭ polupustyni. **[The afforestation of sands in the Terek-Kuma semi-desert.]** *Bot. Ž.* 38 (1), 1953 (131–5). [Russ.] C.G.B.

Gives brief notes on the growth, with diagrams of their root systems, of *Quercus robur, Robinia pseudoacacia, Populus nigra, Ulmus foliacea, U. effusa,* and *Pinus nigra* var. *caramanica* on these sands in the Groznyi region, N. Caucasia. Stresses the importance of determining depth to and salinity of groundwater before deciding whether to plant, and recommends the above species, plus a number of shrubs and fruit trees, for shelterbelts and plantations.

2488. Karpov, V. G. K èkologii rosta drevesnyh porod v pustynno-stepnoĭ zone. **[The growth ecology of woody species in the desert-steppe zone.]** *Bot. Ž.* 37 (5), 1952 (594–609). 32 refs. [Russ.] C.G.B.

Deals with tree growth in shelterbelt and other plantations on the Ergeni hills, Stalingrad, in the semidesert-steppe zone with not more than 330 mm. annual precipitation—mostly in the summer-autumn period when much of it is lost by high evaporation from the surface of the relatively impermeable, heavy-textured, light-chestnut soils that predominate. As the groundwater, except locally, lies too deep to be accessible to tree roots, conditions are highly unfavourable for plantations. Height and height c.a.i. are shown graphically for *Quercus robur, Fraxinus americana, Ulmus* sp., *Robinia pseudoacacia, Gleditsia triacanthos,* and *Acer negundo,* on (1) light-chestnut soils and (2) the moister meadow-chestnut soils of depressions. On (1) the maximum height c.a.i. is reached and passed in the first 10 years of life, some species, e.g. *A. negundo* showing a decline in height increment from 5 years on; at 15–20 years, all species show a sharp drop to $\frac{1}{10}$ to $\frac{1}{30}$ of the maximum ht. c.a.i., though the curves differ in detail for the various species. On (2) height growth is sometimes slower in the first few years than on (1), but its peak comes later and its decline thereafter is more gradual. Only drought-resistant trees are suited to this region; Oak, so widely used as a drought-resistant tree, has done less well here, and the most suitable species are *R. pseudoacacia, Ulmus pinnato-ramosa, U. foliacea, U. suberosa, F. americana, G. triacanthos* and *Acer tataricum.* Of these *Robinia* and *Gleditsia*

sometimes lose their leader through frost (— 39° C.). In practice, the figures obtained mean that plantations will reach their full height—possibly 4–5 m. for (1) and 6–6·5 m. for (2)—at 20–25 years old, after which the declining vigour of the trees may well be accompanied by serious mortality. Thus the central problem for future research must be to attempt to find means of conserving or providing enough water to keep the trees in growth not only in their first few years but also later.

2489. **[Special number devoted to the cultivation of Eucalypts in Cyprus.]** *For. Treasures* 9 (2), 1953 (3–22).

2490. **Ridging in plantations on the clay plains, under rainfall.** *Rep. For. Dep. Sudan 1951/52*, 1953 (39–43).

Experiments were made on several sites with heavy clay soils to determine the efficacy of ridging with a Killefer plough before planting superior species on savanna. The results showed no appreciable benefit from ridging except in the case of *Azadirachta indica* sown at stake. Weeding, on the other hand, was decidedly beneficial.

2491. Rogers, L. J. **A report on afforestation in Uruguay.** FAO, Rome. No. FAO/53/11/9530, 1953. pp. 25.

235. *Underplanting, Advance Planting etc. Nurses and Formation of Mixtures. Interplanting of Inferior Growth*

See also Nos. 2333, 2395, 2403, 2514, 2655.

2492. **Broadleaf Mahogany reacts well to direct seeding, underplanting, and thinning.** *Carib. For.* 14 (1/2), 1953 (13–6, 46–8). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

After one failure in 1950, good results were obtained in Puerto Rico in 1951 with direct sowing of *Swietenia macrophylla* at 4 seeds per spot under a thinned canopy about 20 ft. high. About 40 acres of secondary rain forest in the Luquillo forest were successfully underplanted; after 18 months the *S. macrophylla* averaged 5 ft. in height. It is necessary to remove climbers at least one or twice in such plantations and to maintain an open canopy. Thinning of a small 1931 plantation of *S. macrophylla* in the rain-forest zone after 20 years' growth has paid for the cost of planting (without interest). The health, size and growth rate of the trees show that this is a promising species for protected sites in the rain-forest zone. Thinning experiments made in 1950 in a 13-year-old plantation in the Río Abajo forest (ca. 320 trees/acre removed, leaving 400) have stimulated diameter growth: average annual diam. growth per tree for the 2 years since thinning was 0·48 in., compared with 0·44 in. in adjacent unthinned plots. The freed dominants are making very rapid height growth and at least 50 trees/acre stand out well above the general canopy level. [Cf. *For. Abstr.* 12 (No. 2515).]

2493. ***Casuarina* stands provide good environment for underplanting.** *Carib. For.* 14 (1/2), 1953 (21–2, 52–3). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

A study of conversion from *C. equisetifolia* to other forest crops was begun in Puerto Rico in 1949 and 1950, when underplantings of various species were made on 2 different sites. Plantations on a shallow soil in the St. Just Experimental Area show great promise after 3 years. Six species are growing here more vigorously than would be expected in the open on this site; they are *Guarea trichilioides, Cordia alliodora, Petitia domingensis, Tabebuia pallida, Inga vera* and *Swietenia macrophylla.*

2494. **Cedro macho [*Hieronyma clusioides*] survives planting well.** *Carib. For.* 14 (1/2), 1953 (25, 56–7). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Underplanting in the Puerto Rican forests with *H. clusioides*, both from seed and from 10- to 16-in. stock gave (except in one case) 80% or more survival.

2495. Bindseil. Die Buche als Erzieherin des Waldes. **[Beech as nurse tree in the forest.]** *Holz-Zbl.* 80 (28), 1954 (361). [G.]

Discusses the rôle of Beech as a nurse of Oak, Larch, and Pine.

236. *Care of Regeneration or Plantations in the Initial Stages of Establishment (including Regeneration Surveys)*

See also Nos. 2380, 2490, 3135.

2496. **A portable power brush and weed cutter.** *Fire Control Notes* 15 (1), 1954 (9–11).

Describes a portable power weed-cutter fitted with a chain-saw head for cutting brush.

2497. Parker, J. T., and Potter, J. A. **Relation between stocking percent and number of trees per acre in reproduction surveys.** *Res. Note U.B.C. For. Club* No. 3, 1951. pp. 4 + 3 gphs. 5 refs.

Correlation of actual number of seedlings/acre with % stocking was done by constructing freehand curves relating the variables. [Cf. *For. Abstr.* 15 (No. 257).]

2498. Trousdell, K. B. **A comparison of two systems of measuring stocking of Loblolly Pine seedlings.** *Res. Note Stheast. For. Exp. Sta.* No. 48, 1954. pp. 2.

The relation of % stocking by milliacres to % stocking by $\frac{1}{100}$-acre circular plots is shown in a graph.

237. *Amelioration of Forest Sites*

See also Nos. 2330, 2380, 2779.

2499. Le phosphate Thomas en sylviculture. **[The use of basic slag in forestry.]** Services Agronomiques des Producteurs de Phosphate Thomas, 47 Cantersteen, Brussels. 1953. pp. 40.

Deals for the most part with the Sart-lez-Spa experiment in fertilizing Spruce [cf. *For. Abstr.* 15 (No. 238)] but also gives some notes on the effects of applying basic slag at time of planting to fruit trees and Poplars.

238. *Timber Plantation Crops requiring Special Treatment*

2500. Valenzuela, R. H. El álamo en Chile **[Poplar in Chile.]** *Chile maderero* 3 (15), 1953 (6). [Span.]

The most widely cultivated Poplar in Chile is *Populus nigra* var. *italica*. Brief notes are presented on the soils in which it grows, uses of the wood, establishing and tending plantations and yield of timber.

24. TENDING OF STANDS AND TREES

242. *Thinnings*

See also Nos. 2380, 2492, 2750, 2775, 2810.

2501. Wohlfarth, E. Das Ende der Durchforstung? Ein Beitrag zur Erziehung der Bestockung. **[The end of 'thinning'? A contribution to [the history of concepts and terminology of] crop tending [in German-speaking countries].]** *Allg. Forst- u. Jagdztg.* 123 (6), 1952 (160–70). 29 refs. [G.g.]

A critical analysis of changing ideas, from Hartig's invention of the word '*Durchforstung*' in 1791 to the growing reaction against the system of ideas which it is now felt to imply, with discussion of the terminology and meaning of all forms of tending from earliest youth to maturity and suggestions for terms appropriate to the present day. Includes useful tables comparing the usage of leading German foresters as regards the operations which they understood as (1) different forms of tending, (2) *Jungwuchspflege* and (3) *Läuterung*, or synonyms of these words.

2502. Guttenberg, S. **Growth and mortality in an old-field Southern Pine stand.** *J. For.* 52 (3), 1954 (166–8).

Compares the effects of several degrees of thinning in a dense old-field stand of Loblolly and Shortleaf Pine. Such stands are capable of a good response even to belated thinnings.

2503. Evans, T. C., and Gruschow, G. F. **A thinning study in flatwoods Longleaf Pine.** *J. For.* 52 (1), 1954 (9–10).

Data from 22 plots on Longleaf Pine soils in the Osceola and Olustee forests bear out experience elsewhere that maximum volume production of this species is obtainable over a wide range of stand density. They further suggest that fairly light densities favour vertical and lateral crown development and the production of resin or forage with less loss in volume production, than is generally supposed.

2504. Wahlenberg, W. G. **A 37-year test of thinning Appalachian White Pine.** *Sth. Lumberm.* 187 (2345), 1953 (180–2).

Gives figures for *Pinus strobus* planted on eroded lands on the Biltmore Estate showing the effect of 6 thinnings (1916 to 1953) on tree growth as measured in 1953, 53 years after planting and the total yield per acre in volume of products and value of stumpage including both thinnings and the 1953 stand.

2505. Wilson, R. W., Jr. **How second-growth northern hardwoods develop after thinning.** *Sta. Pap. Ntheast. For. Exp. Sta.* No. 62, 1953. pp. 12.

Gives graphs and tables showing diameter increment, b.a. increment, recruitment and mortality for 6 main species and for the thinned (20–30% b.a. removed) or unthinned stand as a whole, in 1941 and 1951, the stand being 60 years old in 1936 when the study began. Concludes that thinnings should be frequent, starting at 40 years or earlier and repeated at 10-year intervals or oftener.

2506. Minckler, L. S. **How thinning influences growth of Pin Oak.** *Tech. Pap. Cent. St. For. Exp. Sta.* No. 139, 1953. pp. 8. 5 refs.

Results of thinning in 1949, in a previously unmanaged 35-year-old stand of *Q. palustris*, show that in such a stand heavy thinning is desirable. The first thinning should normally be made at 20–30 years and subsequent thinnings every 4–8 years.

2507. Assmann, E. Die Theorie der Grundflächenhaltung und die Praxis der Bestandespflege bei der Rotbuche. **[Theory of basal area and practice of stand tending with *Fagus sylvatica*.]** *Forst- u. Holzw.* 9 (5), 1954 (91–3). [G.]

A commentary on Arnswaldt's article [cf. *For. Abstr.* 15 (No. 1355)] pointing out that less intensive thinnings are not incompatible with satisfactory diameter increment.

2508. Heikinheimo, O. Puun rungon luontaisesta karsiutumisesta. **[Natural pruning of trees.]** *Metsät. Aikak.* 1953 (12), (397–9). [Fi.e.] (*Metsätietoa, Helsinki* No. 2, 1953.)

The following conclusions are drawn from results of investigations at the Forest Research Institute, Helsinki: (1) Self-pruning is not usually most effective in overdense stands; best results are obtained in moderately dense stands of medium quality. (2) The advantages, as regards self-pruning, of thinning young stands are that dry branches are knocked off during the thinning operation and that conditions after thinning are more suitable for self-pruning. (3) Birch should be thinned earlier and more often than Scots Pine to encourage self-pruning. *From author's summary.*

243. *Opening of the Canopy (Increment Fellings, Overhead Release and Improvement Fellings)*

See also No. 2380.

2509. **Studies in cutover forest guide management.** *Carib. For.* 14 (1/2), 1953 (11–3, 44–6). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Growth over 5 years in 4 plots in the Puerto Rico forests subjected to improvement fellings in 1947 [cf. *For. Abstr.* 14 (No. 335)] shows a sharp contrast in the 2 types of forest. Diameter growth in the Tabonuco type has accelerated by 50%, whereas there has been no change in the Colorado type.

2510. Clark, F. B., and Liming, F. G. **Sprouting of Blackjack Oak in the Missouri Ozarks.** *Tech. Pap. Cent. St. For. Exp. Sta.* No. 137, 1953. pp. 22. 1 ref.

The experiments were made on 2400 second-growth *Q. marilandica*, the major variables being

depth and month of girdling, tree diameter, dominance and crown size, and competition by untreated trees. Trees band-girdled (to a sapwood depth of 0·2 in.) sprouted less, had a higher sprout mortality, fewer sprouts per sprouting trees, and smaller sprout clumps than trees notch-girdled (to a sapwood depth of 0·25–0·75 in.). Treatment in June gave the best results and treatment during the growing period better results than that during dormancy. As tree diameter increased, the % of girdled trees sprouting decreased and sprout mortality increased. For trees over 10 in. d.b.h. all methods of killing the tops should be satisfactory. A girdle 35 in. from ground level gives fewer trees sprouting and is more convenient than one at 6 in. Dominance of trees 5 in. d.b.h. and over had no noticeable effect on % of trees sprouting; with smaller trees the % decreased slightly with decreasing dominance. Sprout mortality varied very little with dominance. Heights of sprouts and width of sprout clumps increased with increasing dominance. Competition by untreated trees affected sprouting per tree, sprout growth decreasing with increasing competition. Other things being equal, larger trees should be girdled first.

245. *Tending of Trees, Pruning etc.*

See also Nos. 2380, 2644, 2716.

2511. HEIKINHEIMO, O. Puiden keinollisesta karsimisesta. [**Artificial pruning of trees.**] *Metsät. Aikak.* 1953 (12), (399–402). [Fi.e.] (*Metsätietoa, Helsinki* No. 2, 1953.)

Reviews pruning experiments at the Finnish Forest Research Institute and recommends, on the basis of the results, that pruning should be done: (1) on good sites; (2) on dominant trees; (3) early in stand development; and (4) in connexion with continuous thinnings to allow space for development of the pruned trees. Advice on pruning technique is also given. *From author's summary.*

2512. ANDREWS, S. R. **Effect of pruning on western red rot in young Ponderosa Pine in the Southwest.** *J. For.* 52 (1), 1954 (33–8). 5 refs.

[See *For. Abstr.* 10 (No. 244); 12 (No. 1570).] Cultures made at pruning and 10 years later from diseased branches, knots and stems at several points inwards along the path of infection show that: (1) Knots exposed by pruning are unimportant as entrance points for any decay fungi (dead branch cuts, too dry; green branch cuts, resin-sealed). (2) *Polyporus anceps* (western red rot) entering through recently dead branches, is the only important fungus. It is often established in knots before pruning; 73% of the infections that extended inside the pruning cut were in tight knots and of these ⅛ had reached the heartwood. (3) Where penetration does not reach the heartwood, isolation tests suggest that pruning arrests or kills the fungus in some knot infections. (4) The therapeutic effect of pruning was confirmed in a repeat test over an extended area where (*a*) the % of positive isolations was lower from infections exposed by pruning than from those of unpruned branches; (*b*) positive isolations from tight-knot infections exposed by pruning were ca. ¼ of those from unpruned branches, the difference being most marked in infections limited to the outer 0·1 ft. of tight knots and least where penetration exceeded 0·2 ft.; (*c*) infections exposed by pruning develop more slowly in 50- than in 60-year trees; the % of such infections that were active, had already reached the heartwood, or were likely to get there, was 19 for 50-year and 54 for 60-year trees. For unpruned branches these %'s were 73 and 80 respectively. In stands of less than 60 years there are usually many silviculturally desirable trees that will be protected from subsequent infection up to the height of pruning. *From author's summary.*

2513. ROHMEDER, E. Wundschutz an verletzten Fichten. II. Teil. [**Protective treatment of wounds on injured Spruce trees. Part II.**] *Forstwiss. Cbl.* 72 (11/12), 1953 (321–5). 9 refs. [G.g.]

A review of work noticed in *For. Abstr.* 1 (103) and a report on a further examination of trees treated with protective coatings and of controls. The examinations were made (1) in 1947–8 on trees thrown during a severe storm in 1946, and (2) on trees felled with the rest of the stand in 1952. On all wounded trees not treated with a protective coating a high degree of decay was present, amounting to an average of 51% (maximum over 90%) of the volume of wood in the stem. None of the treatments had given complete protection, but a preparation of the former I.G. Farbenindustrie (not yet on the market) and de-acidified coal-tar individually reduced the severity of attack and its spread by 26%. Winter wounding gave rise to less infection than summer wounding, and shallow wounds to less infection than deep ones. Since trees are more susceptible to wounding when the sap is rising it is advisable to fell and extract, as far as possible, in winter. On the whole, attack and spread of infection is lighter in the upper half of the stem than in the lower. In winter slight wounds may safely be left a few weeks before treatment.

25. TREATMENT OF DEFECTIVE, DERELICT OR VERY OPEN STANDS

2514. PARTOS, G. Alátelepítés. [**Underplanting.**] *Erdö* 1 (2), 1952 (131–4, 163, 167). 3 refs. [Hung.russ.f.]

The author discusses the main, but hitherto neglected, rôle of underplanting in Hungarian forestry, viz., for rehabilitating the many thousand hectares of ruined stands, e.g. the 30- to 40-year-old *Quercus robur* on the uplands, and also numerous stands of *Q. cerris* and Hornbeam. Species recommended include Beech, Lime and Red Oak [*Q. borealis*?]; also Spruce, Silver Fir (both on certain types of soil) and above all, Douglas Fir. The poor Robinia on the Alföld must be clear felled and the soil properly cultivated before replanting.

2515. WAHLENBERG, W. G. **Three methods of rehabilitation for depleted Appalachian hardwood stands.** *J. For.* 51 (12), 1953 (874–80).

In a forest consisting of 3 species of White Oaks, 4 Red Oaks, 3 Yellow Pines and 9 other desirable species, now adequately fire-protected but still siviculturally neglected, the results over 20 years are compared of: (*a*) clear cutting; (*b*) selection, by removing culls and less desirable merchantable

stems of all sizes in favour of White Oak to 61% of the initial log and cordwood volume; (*c*) flexible diam. limit cutting removing about half the 14-in. class and most of the larger trees, amounting to 40% of the initial volume; (*d*) undisturbed control. The 20-year increments of (*b*) and (*c*) were each about double that of (*d*) and about ¾ that of (*a*); (*b*) was superior to (*c*) in sawtimber value increment, compound-interest earning and stand quality improvement. This system (*b*) is a suitable method for preparing typically decrepit stands for systematic management.

2516. McKnight, J. S., and Putnam, J. A. **Logging cut-over stands of bottomland hardwoods.** *Sth. Lumberm.* 185 (2321), 1952 (184–6).

Experimental felling in areas averaging 900 bd. ft./acre, leaving the best trees for future growth, was found with careful planning and close supervision, to provide a small margin for profit, while improving the stand considerably.

2517. Aubréville, A. Les expériences de reconstitution de la savane boisée en Côte d'Ivoire. **[Experiments in the rehabilitation of wooded savanna in the Ivory Coast.]** *Bois For. Trop.* No. 32, 1953 (4–10). [F.e.span.]

Describes experiments carried out between 1937 and 1953, which show that either fire exclusion or careful early burning leads to a progressive improvement in the wooded savanna of the Ivory Coast. Best results are obtained when the area has been logged before fire protection is applied, so that coppice growth may be obtained.

26. COMBINATIONS OF FORESTRY WITH AGRICULTURE AND PASTORAL HUSBANDRY (INCLUDING SHELTERBELTS AND THEIR TREATMENT)

261. *Alternate Forestry and Agriculture, Periodic or Temporary Agricultural Use of Forest Land*

See Nos. 2210, 2426.

262. *Fuel and Fodder Forests*

2518. Seth, S. K. **Afforestation in the Gangetic basin.** *Bull. U.P. For. Dep.* No. 20, 1951. pp. 33.

Annotated lists of species suitable for fuelwood and fodder plantations in areas (1) with more and (2) with less, than 35 in. rain p.a.

265. *Strips or Lines at Road, Rail and Canal Sides etc.; Hedgerow Trees*

2519. Floyd, C. **Hedgerow and farm timber [in England and Wales].** *Quart. J. For.* 48 (1), 1954 (16–23).

Discusses the importance and future prospects of hedgerow timber from both the economic and the amenity point of view.

266. *Shelterbelts, Windbreaks*

See also Nos. 2239, 2488, 2661.

2520. Sneesby, N. J. **Wind erosion and the value of shelterbelts.** *Agriculture (J. Minist. Agric., Lond.)* 60 (6), 1953 (263–71). O.R.E.

Discusses ways of preventing 'blows' in the fens and sandy soils of E. Anglia and the desirability and effectiveness of shelterbelts. Results are included of an enquiry into the usefulness of windbreaks against windblow made in the Ely and Bury St. Edmunds district by the Agricultural Land Service.

2521. Schwarz, H. Gehölzschutzanlagen im Flugerdegebiet des südlichen Wiener Beckens. **[Planting for protection in the wind-eroded area of the southern Vienna Basin.]** *Öst. Vjschr. Forstw.* 94 (3/4), 1953 (211–9). [G.]

An account of the problem to be faced and of existing protection with recommendations for the planning of a shelterbelt system, for choice of species and for tending and protecting the belts, especially against insects and damage by deer.

2522. Andreae, E. Le rideau-abri de l'Épinette et ses peupliers. **[The Épinette shelterbelt and its Poplars.]** *Forêt, Neuchâtel* 7 (2), 1953 (22–4). [F.]

Gives data on the volumes of a number of 'Carolina' Poplars felled at different times in Swiss shelterbelts, particularly in that at Épinette, established in 1912 with plants of unknown origin.

2523. Søegaard, B. **Outline of shelterbelts and shelterbelt tests in Denmark.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 11 (No. 3), 1953. pp. 12. [E.] Limited distribution.

Discusses research on the effect of shelter on crop yields and of different types of shelter on wind speed, the history of shelter planting in Denmark and the development of a system of State help for planting.

2524. George, E. J. **Thirty-one-year results in growing shelterbelts on the Northern Great Plains.** *Circ. U.S. Dep. Agric.* No. 924, 1953. pp. 57. 23 refs.

2525. Linde, R. J. van der. **Some aspects of the problem of shelter in cultivated areas.** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 11 (No. 1), 1953. pp. 10. 30 refs. [E.e.] [Institute for Biological Field Research T.N.O., Oosterbeek.] Limited distribution.

A review of literature on the effect of windbreaks on the microclimate, populations of wild life, fungi and insects, and crop yields.

2526. Woodruff, N. P., and Zingg, A. W. **Wind-tunnel studies of fundamental problems related to windbreaks.** U.S. Department of Agriculture Soil Conservation Service, Washington. No. *SCS–TP*–112, 1952. pp. 25. 30 refs.

Report on a study made jointly by the Soil Conservation Service and Kansas Agricultural Experiment Station. Wind-tunnel data are given on the effect of barrier shape on flow patterns, similarity of flow patterns, and the zone of influence of single barriers of different shapes. The studies indicated that the protected areas in the lee of barriers vary as the square of the length of the barrier normal to the wind for values up to ca. 20 *h*, and that the shape of this area is parabolic, regardless of the angle of approach of the wind. *From authors' summary.*

2527. Nägeli, W. Untersuchungen über die Windverhältnisse im Bereich von Schilfrohrwänden. **[Researches on the behaviour of wind in relation to reed fences.]** *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (2), 1953 (213–66 + 4 plates). 26 refs. [G.g.f.]

A detailed report on fundamental shelterbelt research carried out with reed fences, 2·2 m. high and 25 m. long, of two degrees of permeability. Preliminary experiments showed that the effect of such fences was roughly the same as that of natural shelterbelts of the same degree of permeability, and that from the purely aerodynamic point of view the depth of a shelterbelt plays no part except in so far as it is necessary to maintain the stand. The factors studied included wind speed and direction at various heights (from $\frac{1}{4}$ to 4 times the height of the fence) and distances both to windward and leeward of the fences, the behaviour of wind at the exposed ends of the fences and at breaks in the fence, and the effect of the fences on drifting of snow. The French summary of the paper is full and detailed.

2528. Nägeli, W. Die Windbremsung durch einen grösseren Waldcomplex: ein Beitrag zum Problem der Schutzstreifenbreite bei Windschutzanlagen. **[Reduction in wind speed by a large forest complex: a contribution to the problem of breadth of belts in establishing windbreaks.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953*, Section 11 (No. 2), 1953. pp. 5 + 1 gph. 6 refs. [G.] [Eidgenössische Forstliche Versuchsanstalt, Zürich.] Limited distribution.

Measurements were made on the effect on wind speed of a coniferous forest (mainly Spruce) near Solothurn, 2½ km. long from N. to S., and averaging 500 m. broad. The trees on the W. side were 70–80 and on the E. 50 years old, and tree height, likewise decreasing from W. to E., averaged about 28 m. Results show a drop in speed from 100% at 252 m. ($9 \times$ tree height [h]) to windward of the forest, to 62% at the windward edge of, and a minimum of 11% within the forest. At the leeward edge the speed rose again to 22%, at 28 m. ($1 \times h$) to 50%, and at 840 m. ($30 \times h$) to 96%. Comparison with figures for a shelterbelt of comparable density but only 20 m. broad showed little difference to exist on the windward side; inside the 20-m. belt wind speeds remained at least 33% above those in the forest, but leeward speeds were lower for about $20 \times h$. Comparative measurements on these 2 belts and on a reed fence 0 m. broad showed that at $0–5 \times h$ to leeward, wind speed was lowest for the 20-m. belt, but that at $5–20 \times h$ it was lowest for the reed fence. It was higher at all distances to leeward for the forest belt than for the other two types of windbreak.

2529. Milošević, M. Šumski snegozaštitni pojasevi kao zaštita železničkih pruga od zavejavanja. **[Forest snow shelterbelts as protection of railway lines against snow drifts.]** *Šumarstvo* 6 (6), 1953 (554–9). [Serb.e.g.]

The first snow shelterbelts along railway lines were planted in Jugoslavia in 1949, using *Acer negundo*, *A. pseudoplatanus*, *Caragana arborescens*, *Gleditsia triacanthos*, *Lonicera nigra*, *Populus nigra* var. *italica* and *Robinia pseudoacacia*, all of which have given good results. Systematic research is advocated to determine the most favourable species for different localities.

2530. Zorboski, M. Racionalizacija pri obeležuvanjeto na redovite vo polezaštitne šumski pojasi. **[Rationalization of marking planting lines in field shelterbelts.]** *God. Zborn. zemj.-šum. Skopje* 4, 1953 (183–98). 6 refs. [Maced.g.]

Illustrated description of a horse-drawn appliance for marking the rows in shelterbelt plantations.

268. *Pastured Forests. Grazing on Forest and Open Ranges. Forage Plants etc.*

See also Nos. 2221, 2503, 2614–5.

2531. Albes. Gedanken eines Forstmannes zur Waldweide. **[A forester's reflections on forest grazing.]** *Dtsch. Landwirtsch.* 5 (1), 1954 (44–7). [G.]

Discusses present regulation of forest grazing in different districts of Germany, the damage caused to the forests and the advantages to the stock owners, and makes some recommendations for future policy, emphasizing the need for separating grazing and forestry in the Harz and Thüringer Wald.

2532. Poncet, A. Mélèzes et pâturage. **[Larches and grazing.]** *Rev. for. franç.* 6 (1), 1954 (19–24 + 5 photos). 2 refs. [F.]

Discusses the open Larch stands of the dry alpine region of Briançon, which are regularly grazed by both sheep and cattle. The shade and deep-rooting habit of the Larch make possible a good stand of herbage where nothing but ericaceous vegetation would otherwise grow, and are thus a condition of the dairy industry. The problem of regeneration is briefly discussed.

2533. Gaines, E. M., Campbell, R. S., and Brasington, J. J. **Forage production on Longleaf Pine lands of southern Alabama.** *Ecology* 35 (1), 1954 (59–62). 5 refs.

A study was made in second-growth Longleaf Pine [*Pinus palustris*] lands in southern Alabama to determine relationships between production of grasses and forbs and several ecological factors. Herbage production decreased as the basal area of the tree stand increased. The curvilinear regression showing this relationship is highly significant statistically, but accounts for only 14% of the variation in herbage production. Distribution of the tree stand also affects herbage production. A single Longleaf Pine tree, 7 to 14 in. d.b.h., influences grass production only 6 to 8 ft. from the trunk, while a group of trees reduces herbage production up to 20 to 30 ft. away from the forest wall. Weight of tree litter was closely associated with herbage production. The linear regression is highly significant statistically, and accounts for 21% of the variation in herbage production. Three major upland soil groups were recognized in this study. The mean herbage production per acre (adjusted to average litter weight) by soil groups was: soils with clay subsoils—860 lb., soils with loam subsoils—680 lb. and deep sands—470 lb. Soil groups and litter weight together account for 31% of the variation in herbage production. Herbage production was highest on moist sites favourable to slender

bluestem. Uplands produced about 2·75 times as much grass as did the bottomlands. Since bottomland soils are basically more productive than upland soils, the difference is attributed to heavy brush and tree competition in the bottoms. *Authors' summary.*

2534. Halls, L. K. **Improved cattle forage under Southern Pines.** *Sth. Lumberm.* 187 (2345), 1953 (218, 220).

Experiments showed that fodder grass species and clover could be established under light tree canopies (b.a. 15 sq. ft./acre or less) after burning and fertilizing. Poor results were obtained under moderate and dense canopies (b.a. over 50 sq. ft./acre). Clover appeared to be killed by the accumulation of litter under the denser stands rather than by lack of light.

2535. Shepherd, W. O., Southwell, B. L., and Stevenson, J. W. **Grazing Longleaf/Slash Pine forests.** *Circ. U.S. Dep. Agric.* No. 928, 1953. pp. 31.

A study of grazing with a view to proper management of cattle in the 'piney woods'.

2536. Johnson, W. M. **Effect of grazing intensity upon vegetation and cattle gains on Ponderosa Pine/bunchgrass ranges of the Front Range of Colorado.** *Circ. U.S. Dep. Agric.* No. 929, 1953. pp. 36. 8 refs.

2537. Rensburg, H. J. van. **Encroachment and control of shrubs in relation to grassland development in South Africa.** *E. Afr. agric. J.* 19 (2), 1953 (61–5). 13 refs.

Summary account illustrated with Tanganyika examples.

27. ARBORETA. ARBORICULTURE FOR ORNAMENTAL PURPOSES. HEDGES AND HEDGE PLANTS

2538. Pourtet, J., and Turpin, P. Le Populetum national de Vineuil (Loir-et-Cher). **[The national Populetum of Vineuil (Loir-et-Cher).]** *Rev. for. franç.* 6 (1), 1954 (9–18). [F.]

Describes the soil, lay-out etc. of the arboretum and also gives some figures for increment of various hybrids (*P. serotina*, *P. robusta*, *P. regenerata*) and of *P. deltoides*.

28. HUSBANDRY OF FOREST PRODUCTS OTHER THAN WOOD

See also section 892.

283. *Fruit and Seed Crops*

See No. 2324.

284. *Crops Tapped for Exudations*

See also Nos. 2503, 2637.

2539. Schopmeyer, C. S. **Removable gutters: key to better conservation of naval stores timber.** *Sth. Lumberm.* 187 (2345), 1953 (112–5). 5 refs.

The use of spiral gutters [cf. *For. Abstr.* 15 (No. 1387)] allows tapped trees to be used for pulpwood or poles. The need for modification in tapping practices to ensure acceptable quality in the residual timber is stressed.

2540. Schopmeyer, C. S. **The characteristics of a high-gum-yielding tree.** *Res. Note Stheast. For. Exp. Sta.* No. 39, 1953. pp. 2.

Recent research at the Lake City Research Centre has shown that the controlling characteristics are: (1) the size of the radial resin ducts exposed by taping; (2) the number of resin ducts per sq. in. of freshly-exposed face; (3) the viscosity of the resin; and (4) possibly the pressure within the tree tending to force the resin outwards. The research will be described in more detail elsewhere. [Cf. *For. Abstr.* 15 (No. 308).]

2541. Larson, P. R. **Turpentine trees remain healthy after nine years of acid work.** *Naval Stores Rev.* 63 (23), 1953 (12–3).

Illustrated by yields from H_2SO_4-treated *Pinus elliottii* in Baker County, Florida.

2542. Langdon, O. G. **Gum yields of south Florida Slash Pine [*Pinus elliottii* var. *densa*].** *Res. Note Stheast. For. Exp. Sta.* No. 47, 1954. pp. 2.

Yields in a small-scale test were considerably lower than those from the common Slash Pine [*P. elliottii*] of N. Florida and S. Georgia, and resin-tapping on a commercial scale is not recommended.

2543. Dudić, M. Intenzitet lučenja smole *P. nigra* u borovom području Donja Krivaja. **[Intensity of resin flow from *P. nigra* in the Pine region of Donja Krivaja [Bosnia-Herzegovina].]** *Šumarstvo* 6 (6), 1953 (525–37). [Serb.e.g.]

Presents the results of tests in 1939–40 on the tapping of 7200 Pine trees by the French method, the width of face being 8–9 cm., and depth 3–5 mm.

2544. Machado, D. Pereira. Influência da operação da resinagem na frutificação do pinheiro bravo. **[Effects of resin-tapping on fruiting of *Pinus pinaster*.]** *Estud. Inform. Serv. flor. aqüic. Portugal* No. 3–*C*3, 1953. pp. 7. 3 refs. [Port.e.] Limited distribution.

Preliminary observations on 2 *Pinus pinaster* trees have shown that resin-tapping increases the seed-bearing powers of the tree in the same way as girdling and that the effect begins to appear 2 years after tapping has begun. Some practical applications of this phenomenon are discussed. Further investigations will be made in order to obtain statistical data.

2545. Hofman, J. Brslen. **[*Euonymus*.]** *Lesn. Knihovna* (*malá Řada*) No. 29, 1953. pp. 116. 54 refs. [Cz.] Price *Kčs.*10.

Includes sections on ecology, growth, propagation, planting, vegetative propagaion, establishing stands and plantations; with some hints for amateur investigators.

2546. Mackevič, N. V., and Koščeev, A. L. Ukorenenie i guttonakoplenie zazemlennyh steblei bereskletov. **[Rooting and gutta-percha accumulation in earthed-up stems of *Euonymus* spp.]** *Dokl. Akad. Nauk SSSR* 92 (5), 1953 (1069–72). 8 refs. [Russ.] A.P.B.

Since earthing-up the stems of *Euonymus* has come under trial as a means of vegetative reproduction and of increasing the gutta-percha content of the bark [cf. *For. Abstr.* 12 (No. 2675)], success in the latter aim has been variable, the gutta-percha content

having proved in some cases lower than that of controls. The authors' 3-year (1949–51) study of possible reasons for this variation was made in several different parts of the U.S.S.R. on *E. verrucosus* (under forest canopy) and *E. europaeus* (open plantation), using various methods of earthing up. Results (tabulated) indicate that, especially in *E. verrucosus*, the period of new root formation in earthed-up plants is accompanied by a decrease of gutta-percha compared with that of controls. Conditions favouring rapid rooting also favour the accumulation of gutta-percha. Faulty technique in earthing-up and poor soil aeration are held responsible for such decreases as were found; practical recommendations are that the soil round earthed-up plants should be kept loosened in the first 1–2 years, and areas with the best aerated soil should be chosen for this practice.

287. *Bamboo and Cane Growing etc.*

2547. **Bamboo continues rapid growth on better sites.** *Carib. For.* 14 (1/2), 1953 (24–5, 56). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Reports the progress of experimental plantings in Puerto Rico of *Bambusa tulda*, *B. tuldoides*, *B. longispiculata* and *Dendrocalamus strictus*.

30. WORK SCIENCE (WORK STUDIES): GENERAL

See also No. 2554.

2548. **European Commission on Forestry and Forest Products: Pilot Committee on Logging Techniques and Training of Forest Workers: 2nd Session, Helsinki, 16–25 February, 1953: Survey of work and plans in member countries.** FAO, Rome. No. *FAO/EFC/LOG*/14, 1953. pp. 49.

Summarizes the answers from member countries to a questionnaire. Information is given as follows: (1) list of institutions and individuals concerned with research in felling, logging and transport; (2) index to research carried out by (1) under the headings tools, mechanized tools, performance, physiological studies, and transport; (3) detailed index of research work (past and planned); and (4) list of publications on felling, logging and transport.

2549. **A European directory of research and training institutes concerned with the rationalization of forestry work in the field of felling, logging and transport of timber.** FAO and ECE, Geneva. No. *FAO/EFC/LOG*/14 Rev. 1, 1953. pp. 48.

Includes lists of institutions and indexes to the research in progress.

2550. MÅRN, L. M. **Science of forest labour, its objects, methods, application in Sweden and present position in the Royal School of Forestry.** *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953 (109–30). 2 pp. of refs. [E.sw.]

302. *Man and Work (Physiology and Psychology)*

2551. LEYENDECKER, H. Untersuchungen über die körperliche Beanspruchung bei der Waldarbeit im Rahmen einer forstlichen Arbeitsbewertung. **[Studies on bodily exertion in forestry work in connexion with forest work evaluation.]** *SchrReihe forstl. Fak. Univ. Göttingen* No. 6, 1953. pp. 80. 95 refs. [G.]

Analytical work evaluation means that values must be attached to the various demands—e.g. knowledge, skill, responsibility, muscular work—made by a job. Estimated points values for difficulty within each type of demand must then be multiplied by a 'weight' appropriate to the demand, the sum of the figures for points × weights giving a measure of work difficulty. In Part I the author examines this problem in relation to forestry work, suggesting a 5-point scale for a series of such demands, with appropriate 'weights', the highest 'weight' being given to muscular work.

Part II describes exploratory studies made with the aim of discovering whether forestry jobs might usefully be differentiated on the basis of relative energy expended in muscular work (measured in 'work calories'—i.e. Kcal. expended over and above the requirement for basic metabolism when at rest—per unit of working time). For this purpose the jobs studied were analysed into basic actions, e.g. sawing, axe work, walking, rest periods, which were to be timed, so that total energy expended could be reckoned as the product of duration of the actions and the appropriate number of work calories/unit time. A preliminary study of logging work was made on these lines, using estimates of calorie consumption based on data in literature for forest and industrial work. The method of time recording was not, however, precise enough, and it was also decided to undertake a series of respiration measurements on workers engaged in planting and logging work to verify and extend the figures for energy expended. The respiration tests, though few in number and therefore provisional in nature, gave broad confirmation of the data from literature but showed that energy expended varied greatly with rate of work—e.g. for axe work, number of strokes/min.; for sawing, sq. cm. cut/min. Curves are given to show expenditure in Kcal./min. against rate of work in sawing, axe work, walking, barking and trimming. Using a recording stop-clock which gave high-precision timings, the duration of the basic actions was recorded in 15 time studies (7 in Beech and 6 in Norway Spruce logging, and 2 in planting). Energy expended was then calculated, as above, from estimates supplemented by data from the respiration tests. For logging (2-man teams felling, cutting up and manhandling the wood to ride) the surprising result was obtained that the mean energy expended showed very little variation with species or tree diameter. The mean for this work was 5·2 Kcal./min. or ca. 2500 Kcal./8-hour working day, which is near the limit supportable by the human body without injury in the long run. This confirms the high weight attached to muscular work in the provisional rating. For planting (done by women) the mean was ca. 1100 Kcal./8-hr. day. Fatigue was not studied: it is, however, likely to be less important in logging work than in more 'static' work, e.g. planting, pruning.

Part III reviews the pre-conditions for and aims of work evaluation in forestry. To get some insight into probable differences in work difficulty a questionnaire was circulated to 50 foresters and forest workers, 31 of whom completed returns. They were asked to produce ratings of work difficulty, using a points system like that mentioned in Part I, for various planting, logging and pruning jobs. The mean values of replies are given in a tabular comparison with the author's own estimates, and are considered to suggest that proper study would show large enough differences between jobs to make work evaluation worth while. The present wages tariff for loggers takes practically no account of these differences. There is, however, a big obstacle to improvement in wage scales based on work evaluation, viz. that work difficulty will vary from operation to operation in forestry, so that if each operation received its just rating, wages would probably fluctuate too greatly. Differences between employers and workers' unions might well arise over

such questions, and unless practical solutions can be found, there will be no point in solving the problems of work evaluation itself.

303. *Training in Work Science and Efficiency*

2552. **European Commission on Forestry and Forest Products: Pilot Committee on Logging Techniques and Training of Forest Workers: 2nd session, Helsinki 16–25 February, 1953: Training of forest workers.** FAO, Rome. No. *FAO/EFC/LOG*/15, 1953. pp. 34.

Summarizes replies from member countries to a questionnaire on the training of forest workers.

305. *Sequence of Work and Performance (Time and Performance Tables, Evaluation of Work)*

See Nos. 2474, 2551.

306. *Conditions affecting Work (Climate, Site, Stand etc.)*

See No. 2474.

307. *Tools, Equipment, Machines and Working Animals: General*

See also Nos. 2452–3, 2530, 2607.

2553. Informations sur le matériel. **[Notes on equipment.]** *Bois For. Trop.* No. 32, 1953 (82–4). [F.]

Notes on several tractors; and on the 'Coupnette' (with photo), essentially a portable circular saw with 3-h.p. engine, adjustable for use at any angle, which can be used for brush cutting, cutting up firewood or pulpwood, trimming hedges, cutting lawns, digging post holes etc.

31. LOGGING AND TRANSPORT: GENERAL

See also Nos. 2913, 3040.

2554. KÁLDY, J. Tegyük ipari jellegüvé a fakitermelés munkáját. **[The rationalization of timber production.]** *Erdö* 1 (2), 1952 (107–15, 162, 166). [Hung.russ.g.]

The author criticizes the state of timber production in Hungary, which he describes as too little mechanized (conversion 1%, transport 25%, distribution 75%) and the machines available not used to the full. Some 3000 skilled and 12,000 seasonal workers are engaged on production at as many as 1500–1700 centres (widely scattered so that management is difficult), output averaging only about 1 cu.m. man-day. Labour discipline is poor. The flow of timber does not start from felling site till 1 April and the practice of cross-cutting at site delays regeneration operations.

Methods of work rationalization adopted by the U.S.S.R. in 1946 and copied in Czechoslovakia (both described), which raised output to 3·9 cu.m./day were tried in Hungary in spring 1952, with immediate success. Four of the trials are described in detail. Each involved tree-length skidding (in one case, of Scots Pine logs up to 25 m. long and 30 cm.d.b.h.) for 200–400 m. by horse or tractor, then cutting up and stacking by assortments at a carefully planned loading site. At the Szabadszállás estate the trees, 40- to 60-year-old coppice Oak, were uprooted by tractor-winch, the cable being attached to the tree at a height of 150 cm. and the operation aided by root loosening and wedges. The stump was then severed and the log cut up *in situ*. Here a saving of ca. 58% in time and 45% in wages resulted. The author observes that the sites for these trials were ill chosen, the Ministry gave insufficient help and the workers were insufficiently trained in the new methods. Future developments are discussed.

2555. CHAMPANHET. Exploitation et commerce du bois dans le sud indochinois. **[Forest utilization and timber trade in southern Indochina.]** *Études d'Outre-Mer, Marseille* [35] 1952 (206–10). [F.] D.S.I.R.

Since 1945, the transport of logs from the felling site to riverside or railway station has been gradually changing from buffalo-cart to motorized transport. Trees are felled during the dry season. If rafted, they are bundled and floated during the wet season, using Bamboo floats. Considerable quantities of wood are used as domestic fuel and boiler fuel for river craft. Charcoal is made from Mangrove species. The following are exploited: *Dipterocarpus* sp., *Anisoptera cochinchinensis*, *Hopea odorata*, *Shorea cochinchinensis*, *Tarrietia cochinchinensis*, *Pinus insularis*, *P. merkusii*, *Sindora cochinchinensis*, *Dalbergia* sp., *Pterocarpus pedatus*, *Mesua ferrea*, and species of the Myrtaceae. A number of species yield minor forest products (tannins, dyes, resins, gums). Timber from southern Indochina is converted in local sawmills and used locally or shipped to northern Indochina. Exports are negligible.

2556. MICHELL, A. S. **Trends and new developments in the transportation of wood in Eastern Canada.** *For. Chron.* 29 (4), 1953 (348–58). 7 refs.

Among the important trends are closer co-ordination between skidding and hauling phases, increased use of lorry and lorry + trailer in comparison with tractors and a corresponding increase in road construction. Horses, while still the favourite agency for skidding, are being replaced locally by snowmobiles.

2557. LOGAN, W. E. M. **Study of American softwood logging and milling methods with special reference to their potentialities in Kenya.** Government Printer, Nairobi. 1953. pp. iv + 125 + 1 map. 19 refs. Price 15*s*.

A comprehensive and detailed account of logging in the Southern, Northeastern and Western regions of the U.S.A., with special emphasis on the Southern as approximating in climate and labour to Kenya conditions. This subject is treated under forests, topography, climate, general logging factors, felling and cross-cutting, skidding and concentration, loading, haulage and roads. Milling covers small mills both temporary and portable, and medium and large, under equipment and layout (diagrams), crew, log storage, sawing practice, green sorting, recovery, costs, saw filing, yard handling, seasoning (including vapour seasoning), secondary processing, integrated utilization, grading and trade association. Woods and mill waste, pulp, paper, veneers, plies and resin

products are also covered. The valuation of standing timber for sale, and log and tree grading are dealt with, while a final section covers present and future applications to Kenya conditions.

2558. CAMPBELL, R. A. **Logging methods and costs in the southern Appalachians.** *Sta. Pap. Stheast For. Exp. Sta.* No. 30, 1953. pp. 29. 11 refs.

Studies were made on time and costs of log-making (felling, trimming and cross-cutting), skidding, loading and hauling in some 30 different logging operations from 1947 to 1952. They include a comparison of hand and power log-making, team and tractor skidding, hand and power loading, and lorry hauling over different classes of road. Results are given in graphs and tables.

2559. REED, A. H. **The story of the Kauri in word and picture.** A. H. & A. W. Reed, Wellington, New Zealand. 1953. pp. 300 + 132 plates. Price 47*s.* 6*d.*

A history of the exploitation of the Kauri [*Agathis australis*] in New Zealand, with particular reference to early methods of felling and transport. The numerous plates include many old photographs of logs being hauled by bullock teams, floated etc.

32. FELLING AND RELATED OPERATIONS

See also Nos. 2564–9.

322. *Felling Season. Preparatory Measures*

See also No. 2999.

2560. BALDWIN, H. I., and SEDLOCK, E. J. **Chemical de-barking of Elm [*Ulmus americana*].** *Fox For. Note* No. 50, 1952. pp. 1.

Twenty trees were girdled and treated, 10 with Na arsenite and 10 with Na monochloracetic acid in April, June and late Aug. All the trees treated with Na arsenite were dead in late autumn and over half the bolts peeled readily. Over 80% of the other trees were still alive with normal cambium except near the cut. No difference was found between the different seasons of treatment.

323. *Felling and Subsequent Primary Conversion*

2561. O., M. Neues über die Stammpresse. **[A new model of the Simplex 'stem press'.]** *Wald u. Holz, Solothurn* 35 (7), 1954 (148–50). [G.] Also in *Forêt, Neuchâtel* 7 (7), 1954 (137–9).[F.].

The original model of the Swiss Simplex 'stem press'—a cam-operated locking clamp for a cable 'tourniquet' used to prevent sudden splitting of leaning trees while the saw cut is being made during felling—has been in use since the winter of 1945–46. In a few instances the cable has slipped, owing to the difficulty of manufacturing cams with a perfectly regular incline. The author briefly describes and illustrates a new model in which this trouble has been obviated by substituting a wedge for the cam. The wedge has a very smooth, hard back which rests against a pivoted thrust-block, and a cross-ribbed softer face to grip the cable firmly. Tension on the cable only draws the wedge tighter in. The new model features other improvements and simplifications, and costs Swiss Fr.74.

The tree stem must be rounded off and the bark removed where the cable is to encircle it. The clamp is placed about a hand's breadth above the level of the saw cut, on the side opposite to the direction of fall. The cable, passed round the stem and through the clamp, is pulled as tight as possible by hand; the wedge is then inserted and tapped home with the axe-head. Finally, the apparatus is locked by a lever-operated device [not illustrated in detail].

326. *Sequence of Operations (including Felling Instructions, Primary Conversion after Extraction, Composition of Gangs, One-man Work etc.)*

2562. HENNING. Das Rücken des Schichtholzes vor der Aufarbeitung. **[Skidding cordwood before conversion.]** *Forst- u. Holzw.* 9*A* (1), 1954 (13–4). [G.]

[Cf. *For. Abstr.* 14 (No. 1244).] Reports a small-scale experiment in the municipal forest of Katzenelnbogen (Taunus) in the extraction of Beech and Spruce cordwood. On area I, cordwood was sawn at the felling site and stacked by the fellers at the roadside. On area II, the cordwood was skidded by horse, before conversion, to the roadside. The second method seemed to offer certain savings in costs and time.

2563. FEHR, H. Einführung der Einmann-Arbeit im staatlichen Forstamt Kleve. **[Introduction of one-man operations in the Kleve State Forest District.]** *Forst u. Holz* 8 (23), 1953 (341–4). [G.]

Notes on equipment and operations in felling, the result of experimental work in Kleve.

35. PERFORMANCE MEASUREMENTS FOR DETERMINING PIECE RATES IN FELLING AND RELATED OPERATIONS

See also Nos. 2551, 2558.

2564. **[European Forestry Commission] Pilot Committee on Logging Techniques and Training of Forest Workers: Questionnaire on working techniques.** FAO, Geneva. No. *MEFAO*/2/52, 1952. pp. 13.

Including 3 sample forms.

2565. RALSTON, R. A. **Basal area as a guide in estimating logging costs.** *J. For.* 51 (12), 1953 (886–90). 7 refs.

Presents D. M. Mathew's theory that in similar conditions total felling and cross-cutting time varies directly with breast-height b.a. Examination of ten different logging-cost studies shows that hand labour harvests 1 sq. ft. of b.a. at a constant rate regardless of size-class distribution. Applications of the theory lie in stumpage appraisals, estimation of labour requirements, fixing economic cutting limits, setting price rates, and in research. The need for further investigation is recognized. *From author's summary.*

36. TOOLS, MACHINES AND EQUIPMENT FOR FELLING AND RELATED OPERATIONS

See also Nos. 2429–31, 2553, 2561, 2578, 2606, 2731, 2870.

2566. CARPELAN, G. Enmansmotorsågans lönsamhet: några undersökningsresultat. [**The profitability of one-man power saws: some results of research.**] *Norrlands SkogsvFörb. Tidskr.* 1953 (4), (499–576). [Sw.sw.] (*Meddelande från Föreningen Skogsarbetens och Kungl. Domänstyrelsens Arbetsstudieavdelning* (*SDA*) No. 49. [When published separately in the above series the article includes an English summary and a bibliography].)

The study was carried out in 1949, using the Norwegian Jo-Bu saw. The material felled, consisting of Scots Pine and Norway Spruce, was of different diameters; stand densities also varied, and crews of 1, 2 and 3 men were studied. Results are given in graphs showing the diam. limits at which time is saved and costs are reduced. They show that the use of a power saw can save time and be economically profitable for most diameters. Best results are obtained with one-man crews. The use of a power saw reduced stump height by 2 in. The organization of the work to give best results, the desirability of improvements in one-man saws and some aspects of accident risks are discussed.

2567. HASUO, Y. **Some experiments on the cutting performance of an automatic lumbering saw (chain saw).** *Transl. Commonw. sci. industr. Res. Organ. Aust.* No. 1967, 1953. pp. 16 + 4 dgms. + 9 gphs. Transl. by S. J. Oki from *J. Jap. For. Soc.* 30 (1/2), 1948 (1–11). [See *For. Abstr.* 13 (No. 1253).] Limited distribution.

2568. SIMMONS, F. C. **Selection and maintenance of power chain-saws.** *Sth. Lumberm.* 187 (2345), 1953 (270 . . . 275).

2569. BREEVART, H. W. Een nieuwe zaagscherpklem. [**A new clamp to hold [forest] saws during sharpening.**] *Ned. Boschb.-Tijdschr.* 25 (12), 1953 (329–31). [Du.]

Describes with illustrations the 'Bewiva' clamp, which can be attached to a tree or post used in the forest or indoors, and adjusted so that the operator can either sit or stand. There is no need to remove the blade from the frame.

2570. LEWIS, N. **The South Australian climbing iron.** *Aust. For.* 17 (1), 1953 (4–6 + 4 photos).

Describes the type of climbing iron used when taking measurements of *Pinus radiata* in young stands in S. Australia. [Cf. *For. Abstr.* 15 (No. 2429).]

37. TRANSPORT

372/377. *Land Transport*

See also Nos. 2553, 2555–9, 2562, 2587.

2571. GUDIM, Å. Taubaner og taubanedrift i Norge og Mellom-Europa. [**Cableways and their use in Norway and Central Europe.**] *Tidsskr. Skogbr.* 61 (11; 12), 1953 (417–33; 469–82). [Nor.]

Discusses the basic types of cableway and describes in some detail, giving prices and manufacturers' addresses, a large number of models, mainly Swiss, Austrian and Norwegian, with particular emphasis on those suitable for use in Norway.

2572. STEINLIN, H., and ZEHNTNER, K. Untersuchungen zur Verbesserung des Holztransportes im Gebirge. (I. Mitteilung.) [**Research on the improvement of timber transport in mountains. Part 1.**] *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (1), 1953 (131–68 + 6 photos). 15 refs. [G.g.f.]

A preliminary report on a study concerned mainly with the extraction of thinnings and small quantities of wood from regeneration fellings. The installation, working and performance of the Kupfer MF10, self-propelled motor cable winch are discussed in detail with photographs and drawings clearly illustrating the subject. [Cf. *For. Abstr.* 14 (No. 2305).]

2573. JOBST, H. Das Abseilen von Holz im Hochgebirge. [**Skidding wood by hand down mountain slopes.**] *Forstwiss. Cbl.* 72 (11/12), 1953 (346–58). [G.]

Describes equipment, operations and costs of gravity skidding with a ground line operated by hand or by hand-controlled winch.

2574. STEINLIN, H., and ZEHNTNER, K. Reibungswiderstände beim Schleifen von Stämmen auf horizontalen Versuchsstrecken. [**Skidding resistance of logs on flat experimental tracks.**] *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (2), 1953 (315–34). 10 refs. [G.g.f.]

Describes experiments carried out with logs of different lengths, with and without bark, on soils of different degrees of hardness. The coefficients of friction obtained showed that the influence of atmospheric conditions was greater than that of different kinds of soil. The coefficient decreased progressively from dry, hard soil through soil saturated with water, to frozen soil with a light scattering of snow. Barking reduced the coefficient on damp soil by ca. 20%. The length of log had no significant effect on hard ground, but on soft soil the skidded log tends to churn up the ground and push a ridge of earth in front of it; in these circumstances the frictional resistance of tree-length logs is less than that of shorter ones and this difference can be very important. Skidding top first is definitely more satisfactory than butt first, particularly with logs of pronounced taper; the difference is less in tree-length than in shorter logs. The use of chains round the log produces a considerable increase in friction. A skidding pan increases friction on flat ground without snow cover, but diminishes it on snow. The coefficients of friction obtained in this study make it possible to determine the critical gradients for different conditions. Tables showing the tractive force and braking necessary for different types of soil, and conditions and gradients of ground can also be constructed.

2575. PASÁK, V., and KABELÁČ, V. Přibližování kmenů traktorem. [**Tractor skidding of tree-length logs.**] *Lesn. Práce* 32 (9), 1953 (398–404). [Cz.]

Presents tabulated results of tests with and without the use of sheet-iron caps on the logs. The wetness of the soil has a considerable effect on skidding efficiency; without caps the average tractive force

was 40% of the Spruce log weight for wet soil, and 69% for dry soil, the corresponding slip %'s being 16 and 13. On wet soil without caps, the tractive force was 77% of the log weight skidded butt-end foremost, and 73% top-end foremost. The use of a 50-cm.-diam., 38-kg., sheet-iron cap did not markedly affect the average tractive force; its main advantage is helping to overcome obstacles such as roots and stones. The tractive-force/log-volume ratio is almost the same for a single heavy log and several smaller logs of the same total volume. Dynamometer records show a greater constancy of tractive force with than without caps.

2576. Štaud, V. Použitelnost nového československého pásového traktoru 'Z–35' v lesním průmyslu. [**Use of the new Czechoslovak caterpillar tractor 'Z–35', in forestry.**] *Lesn. Práce* 32 (9), 1953 (415–9). [Cz.]

Describes the new tractor, which has a theoretical tractive force of 3000 kg., 5 speeds + 1 reverse, and a 3000 kg. winch. Results of skidding tests are given.

2577. Štaud, V. K lepšímu využití pásových traktorů a kvalitnější práci při sbližování dříví v lese. [**Better utilization of crawler tractors, and more efficient log transport in the forest.**] *Lesn. Práce* 32 (6), 1953 (270–80). [Cz.]

Illustrated description of some minor improvements, e.g. a flat-shaped choker-hook with metal claws (non-slip) and a tyre-tread belt for pulley blocks, to protect the tree stem.

2578. **European Commission on Forestry and Forest Products: Pilot Committee on Logging Techniques and Training of Forest Workers: 2nd Session, Helsinki, 16–25 February, 1953: Mechanisation of wood operations.** FAO, Rome. No. *FAO/EFC/LOG*/11, 1953. pp. 46.

Reports the results of a questionnaire on the criteria and equipment of tractors for forestry work, based on answers from Austria, Finland, France, Germany, Sweden, Switzerland, and the United Kingdom.

2579. Beltetraktor. [**Tracked tractors.**] *Inform. Skogbruk. Skogind. ForsknForen.* (*Transportutv.*) No. 6, [1952?]. pp. 2. [Nor.]

Lists 42 tractors giving details of dimensions, capacity etc. and addresses of Norwegian suppliers.

2580. Troëng, I. Nytt slirskydd för hjultraktorer. [**A new safeguard against wheel-spin for wheeled tractors.**] *Skogen* 41 (1), 1954 (21). [Sw.] (*Medd. SkogsforsknInst., Stockh.*)

The Skogsforskningsinstitut in co-operation with Gustafsson and Hjorth, Mek. Verkst., Katrineholm, have produced, instead of normal chains for tractor wheels, a series of ridged 5 mm. plates, linked by chains. The whole construction can be tightened at the joint to fit closely to the wheel.

2581. Traktortilhengere for tømmertransport. [**Tractor trailers for timber transport.**] *Inform. Skogbr. Skogind. ForsknForen.* (*Transportutv.*) No. 20, 1953. pp. 3. [Nor.]

Describes different types of trailer with one or two axles, and lists models available in Scandinavia, with details of construction, price and agents.

2582. Vippebanke for biltransport av tømmer i bunter. [**A tilting rack for tranporting timber bundles.**] *Inform. Skogbr. Skogind. ForsknForen.* (*Transportutv.*) No. 14, [1953?]. pp. 2. [Nor.]

The rack, described with illustrations, is constructed and patented by Isachsens Mek. Verksted, Larvik. It is mounted on a ring on the chassis of the lorry, and can be swivelled and tilted to one side so that the bundles slide off during unloading.

2583. Tuffier, M. **Equipment notes: all-purpose vehicles manufactured in Europe.** *Unasylva* 8 (1), 1954 (30–9).

Translation of an article in *Bois For. Trop.* No. 29, 1953. [Cf. *For. Abstr.* 15 (No. 1433).]

2584. Strašinskiĭ, B. A. Lesovoznye dorogi stroitj skorostnymi metodami. [**Accelerated methods of constructing forest railways.**] *Mehanizacija Trudoemkih i Tjaželyh Rabot, Moskva* 1953 (3), (17–20). [Russ.] L.S.

A general account of conditions and results of field experiments in applying different machines to forest railway construction, undertaken to raise the relatively low efficiency of labour in new Soviet forest enterprises.

378. *Water Transport*

See also Nos. 2555, 2559.

2585. Abrarov, I. Š. Mehanizacija splotki dlinnyh pučkov. [**Mechanization of bundling long bundles.**] *Mehanizacija Trudoemkih i Tjaželyh Rabot, Moskva* 1953 (3), (20–1). [Russ.] L.S.

Tests conducted by the CNII Lesosplava (Central Institute for Timber Floating Research) in the Rybinsk 'Sea' [artificial lake] favour use of two types of bundles for water transport in impounded waters: (1) long bundles and (2) short deep-draught bundles. The new long bundles give greater stability, closer packing and improved economy in bundling tackle. Their dimensions are: (1) length 27–28 m., width, 4·3 (3·3); height, 2·6 (2·0); draught 2·0 (1·8) m.; volume 120 cu.m.; and (2) length 35–36; width, 5·2 (4·3); height and draught as (1); volume 200 cu.m., the first figure referring to the central part, the bracketed figure to either end of the bundle. Describes and illustrates the prototype bundling machine VKF-AB designed by the Institute, and gives the results of tests conducted in 1952.

2586. Mosevič, P. I., and Singalevič, M. S. Splotočnoe ustroĭstvo pri sortirovočnyh brevnotaskah. [**Raft-bundling appliance for log elevator-sorters.**] *Mehanizacija Trudoemkih i Tjaželyh Rabot, Moskva* 1953 (3), (23–4). [Russ.] L.S.

Describes and illustrates a simple bundling appliance developed in 1952, which enables logs to be bundled without intermediate stacking. Logs are dropped from the elevator-sorter into a kind of hopper which opens more and more as the logs fall into it. When the hopper has reached the maximum width (2·5 m.), the bundle is tied and removed from its base-frame by winch.

2587. Nevskiĭ, E. G., and Butyrskiĭ, Ju. N. Novaja traktornaja lebedka dlja splavnyh rabot. [A

new tractor winch for floating operations.] *Mehanizacija Trudoemkih i Tjaželyh Rabot, Moskva* 1953 (3), (22–3). [Russ.] L.S.

Illustrated description of a winch (2- or 3-drum) mounted on the S-80 tractor and friction-driven. Different uses, in particular for winter transport of packets and bundles, are described.

2588. Troëng, I. Några synpunkter på flottningens hydrodynamik. [**Some aspects of the hydrodynamics of floating.**] *Norrlands SkogsvFörb. Tidskr.* 1953 (4), (459–68). [Sw.]

Discusses briefly some of the basic causes that drive timber from the middle of the floating channel, and means of correcting them by constructions on the river bed.

2589. Veløy, O. Strømdanneren: dens konstruksjon og anvendelse. [**Current makers: their construction and use.**] *Norsk Skogind.* 8 (1), 1954 (26–8). [Nor.] P.R.

Describes a Finnish machine [cf. *For. Abstr.* 13 (No. 372)] and discusses the uses of current makers in timber floating, in melting and removing ice, and in dredging waste at the timber intake of paper and pulp mills.

38. FOREST ENGINEERING

383. *Roads and Bridges*

2590. Rüedi, K. Der Kurven-Minimalradius im Waldstrassenbau. [**The minimum radius of curves in forest-road construction.**] *Schweiz. Z. Forstw.* 105 (1), 1954 (28–37). [G.g.f.]

384. *Protective Works*

2591. Nomenclature des termes techniques pour les travaux de défense contre les avalanches. [**Technical terms for defence works against avalanches.**] *Forêt, Neuchâtel* 7 (3; 4), 1953–54 (44–8; 67–73). [F.]

The various terms are defined and illustrated by drawings and diagrams.

See also Nos. 2381–2, 2400.

2592. Bärner, J. [Compiler]. **Bibliography of plant protection, 1940–1945.** Biologische Zentralanstalt für Land- und Forstwirtschaft in Berlin-Dahlem. 2 vols., 1953. pp. xlviii + 1308. [G.E.F.]

2593. Boyce, J. S. **Introduction of exotic trees: dangers from diseases and insect pests.** *Unasylva* 8 (1), 1954 (8–14).

An extract from a larger study to be published separately. The vicissitudes of a number of N. American species introduced into Europe, and of a few Eurasian species in N. America are discussed.

2594. **European Forestry Commission 6th Session: [Note on] pests and diseases.** FAO, Rome. 1953. pp. 22.

Data derived from a questionnaire to member countries are tabulated in two lists (1) insects and other animals, (2) fungi and other plants, attacking trees in 1952. Data include species attacked, degree of damage, and control measures. There are more detailed reports on some pests.

41. GENERAL TECHNIQUE OF FOREST PROTECTION. TYPES OF INJURY

411. *Natural and Biological Control*

See Nos. 2613, 2661–2, 2678–9, 2684, 2689, 2691, 2708–11, 2714.

414. *Chemical Control*

See also Nos. 2663–9, 2672, 2682, 2705.

2595. Barnes, J. M. **Toxic hazards of certain pesticides to man, together with a select bibliography on the toxicology of pesticides in man and mammals.** *Monograph Series, World Health Organization, Geneva* No. 16, 1953. pp. 129. 689 refs.

42. INJURIES FROM INORGANIC AGENCIES OTHER THAN FIRE

421. *Air Currents*

2596. Mergen, F. **Mechanical aspects of wind breakage and wind firmness.** *J. For.* 52 (2), 1954 (119–25). 16 refs.

Discusses the nature of, and lists, silvicultural precautions against wind-breakage, which probably causes more damage than fire in U.S. forests.

422. *Temperature Influences. Frost. Heat. Drought*

See also Nos. 2262–3, 2328, 2640.

2597. Rol, R. Les gélivures. **[Frost cracks.]** *Bull. Soc. for. Franche-Comté* 26 (12), 1953 (641–51 + 2 plates). 23 refs. [F.]

A review of literature together with the results of some personal observations.

2598. Lachaussée, E. Note sur la roulure et la gélivure du chêne. **[Note on cup-shake and frost crack of Oak [*Quercus robur*].]** *Bull. Soc. for. Franche-Comté* 26 (12), 1953 (655–9). [F.]

It was noted that Pedunculate Oak in the forest of Chaux (*a*) was seriously affected with cup-shake and frost crack, and showed rusty stains following the medullary rays; trees in the forest of Amont-Aval (*b*) were slightly affected with cup-shake and frost crack but showed no staining, while those in the forest of Saint-Aubin (*c*) were perfectly sound. The three forests were similarly situated, within 10 km. of each other, but the soil of (*a*) was very rich in Fe oxide and poor in Ca, while those of (*b*) and (*c*) were very poor in Fe and rich in Ca. Analysis of samples from the butt logs and soils at base of three trees from these three sites showed that the prevalence of defects was closely related to the Ca/Fe ratio in (1) wood and (2) soil. These were as follows: (*a*) (1) 37·5, (2) 0·24; (*b*) (1) 36·5, (2) 4·8; and (*c*) (1) 91·5, (2) 4·3.

The hypothesis put forward to explain these phenomena is that more Fe is taken up from the soil when the Ca/Fe ratio is low and that the presence of larger quantities of Fe in the wood modifies its mechanical qualities and makes it more fissile.

424. *Soil Conditions. Erosion Effects. Nutrient Deficiencies etc.*

See also Nos. 2598, 2630, 2640, 2694.

2599. Brink, V. C. **Survival of plants [including many tree species] under flood in the lower Fraser River valley, British Columbia.** *Ecology* 35 (1), 1954 (94–5). 5 refs.

2600. Stone, E. L., Morrow, R. R., and Welch, D. S. **A malady of Red Pine [*P. resinosa*] on poorly drained sites.** *J. For.* 52 (2), 1954 (104–14). 33 refs.

A stunting and dying of this species in southern New York plantations, 5–40 years old, cannot be ascribed to pathogens or insects. The mortality always occurs where drainage is impeded. The recent increase follows a series of unusually high May rainfalls. Root injury resulting from deficient soil aeration is considered to be the cause. High spring rainfalls are of random occurrence but of sufficient frequency to result in prolonged saturation in poorly drained soils during a rotation of this Pine. Proper planting-site selection is the only practical method of avoiding these losses. *From authors' summary.*

2601. Paine, L. A. **Deterioration in White Spruce plantations [in Quebec].** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (1).

The plantations are on abandoned farm land, and the disorder, characterized by chlorosis, stunting, and poor needle retention is probably due to nutrient deficiency, poor rooting depth and impeded drainage.

2602. Karschon, R. Recherches sur la chlorose de l'Eucalyptus (communication préliminaire). **[Research on chlorosis in *Eucalyptus* (preliminary communication.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 21 (No.

6), 1953. pp. 3. [F.] [Institut de Recherches Forestières, Ilanoth, Israel.] Limited distribution.

A study of soils and of the chemical composition of leaves in young plantations of *E. rostrata* showed that the soils had a high pH and a wide range of contents of active CaO, and that the leaves contained a larger accumulation of CaO and a rather lower Fe_2O_3% than normal leaves. After the application of $FeSO_4$, 80% of chlorotic plants in a 2- to 3-year-old roadside plantation on rendzina developed normal leaves, but the effect was only temporary.

43. FOREST FIRES

431. *Predisposing Factors and Causes. Fire Danger. Fire Behaviour*

2603. Hood, F. C. **Fuel-moisture forecasts.** *Fire Control Notes* 15 (1), 1954 (35–8). [U.S. Weather Bureau Fire Weather District 8, Asheville, N.C.]

An attempt has been made to predict the moisture content (m.c.) of fuel-moisture indicator sticks from meteorological forecasts. Using the results of studies on fuel moisture, relative humidity, fuel temperature and solar radiation, the author developed two tables: (1) showing the relation between m.c. of sticks and dew-point temperatures, and (2) giving adjustments to be made for the influence on stick temperature of predicted meteorological conditions (wind velocity and degree of cloudiness) and shading produced by vegetation and aspect. The use of the tables is illustrated and results are given of a test of the accuracy of fuel-moisture forecasts made in this way 24 hours in advance in April 1952.

2604. Morris, W. G. **Rate of spread on a Washington fern fire.** *Fire Control Notes* 15 (1), 1954 (32–4).

Rate of spread, fuel moisture, and meteorological conditions were measured (data tabulated) on a 4000-acre fire in a cut-over Douglas Fir area with dense ground cover of bracken above logging slash.

432. *Prevention and Control*

See also No. 2496.

2605. Mitchell, J. A. **Rating the effectiveness of forest fire protection.** *J. For.* 52 (3), 1954 (183–5).

Illustrates from records of fires and fire protection in Chippewa National Forest, the importance of applying statistical analysis to such data in order to determine the real effects of protection measures in preventing fires.

2606. Robinson, D. R. **A study of power saw fires.** *J. For.* 51 (12), 1953 (891–6).

Alarming increases have been recorded in the area of fires caused by power saws. In 1951 such fires were responsible for 51% of the total acreage burnt in logging operations in California. Careless practices and recommended safety precautions are detailed. In an analysis of 167 fires the % distribution of those ascribable to rectifiable defects in power saws was:—spark or carbon discharge 16, leaking fuel 10, moss, sawdust etc. contacting hot muffler 33, hot exhaust 11 and backfiring of motor 10. The rating of 21 models of saws in respect of these hazards is tabulated. None meets all the following recommendations:—Muffler to be set as high up as practicable towards the rear; to be double-walled or consist of a perforated pipe protected by a metal shell; air cooling to help to keep its surface temperature below 500° F.; its ports to be screened to break up hot particles; the exhaust discharge to be baffled and directed to the side, horizontally or upwards. [Cf. *For. Abstr.* 15 (Nos. 369–70).]

2607. Mouton, G. Matériel léger pour la lutte contre les incendies de forêt. **[Light equipment for forest fire fighting.]** *Rev. for. franç.* 5 (12), 1953 (832–5 + 2 plates). [F.]

Notes on fire-fighting equipment used in France, including a jeep with trailer adapted to carry 750 litres of water, a motor pump, and 70 m. of 25-mm. hose; and a mobile water-tank mounted on pneumatic tyres, with a capacity of 300 litres at a pressure of 2·5 kg. supplied by a 15-litre bottle filled with compressed air.

2608. **Aerial water bombing instructions.** *Tech. Bull. Ont. Dep. Lds. For.* Revised 1953. pp. 6 + 5 photos.

435. *Benefits of Fire Control. Injurious Effects of Fire. Fire Losses*

See also Nos. 2356, 2517.

2609. Tarrant, R. F. **Effect of heat on soil color and pH of two forest soils.** *Res. Note Pacif. Nthwest. For. Range Exp. Sta.* No. 90, 1953. pp. 5. 3 refs.

On the 2 loams tested, a temperature of 900° F. was needed to alter the colour to a point where there is no further change; the greatest change in pH took place at temperatures below 900° and significant changes at 608°, a temperature previously found to be generated under a heavy pile of Douglas Fir slash. [Cf. *For. Abstr.* 15 (No. 2393).]

436. *Beneficial Effects of Fire. Uses of Fire in Silviculture and Other Forms of Husbandry*

See also Nos. 2356, 2393, 2517, 2609.

2610. Blomgren, Y. Havaintoja kulotettujen alueiden viljelymänniköiden kehityksestä. **[The development of artificially established Scots Pine stands on burnt-over areas.]** *Metsät. Aikak.* 1953 (12), (403–4, 402). [Fi.e.] (*Metsätietoa, Helsinki* No. 2, 1953.)

Concludes on the basis of measurements at the Tuomarniemi Ranger School that the artificially established Pine stands on burnt-over areas have developed faster than naturally regenerated Pine stands and artificially established Norway Spruce stands in similar conditions. The difference in volume is small in young stands but increases with age. The part played by the burn is uncertain, but its effect appears to extend beyond the seedling stage. *From author's summary.*

44. DAMAGE BY HARMFUL PLANTS. VIRUS DISEASES

441. *Weeds*

See also Nos. 2454–5, 2496, 2560, 2644–5.

2611. TJAU, I. K. Mengerdjakan tanah setjara mekanis di daerah hutan Banjuwangi-Selatan. [**Mechanical ploughing in the forest division of S. Banjuwangi.**] *Rimba Indonesia* 2 (8/9), 1953 (346–8). [Jav.e.]

Experimental ploughing of *Imperata cylindrica* areas in Teak forest has been successful, and 300 ha. are to be ploughed and afforested with Teak.

2612. **Pomarrosa [*Eugenia jambos*] can be controlled by partial cuttings.** *Carib. For.* 14 (1/2), 1953 (27, 58). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Two years after felling, stumps of *E. jambos* had produced almost no coppice shoots in the second year, and height growth of first-year shoots was almost negligible. This was due to the closing of the forest canopy. The stumps have not died, but they will probably present no problem so long as a dense canopy is maintained. [Cf. *For. Abstr.* 14 (No. 248).]

2613. FULLAWAY, D. T. **Biological control of insect pests in the Hawaiian Islands since 1925.** [*Bienn.*] *Rep. Bd. Agric. For. Hawaii 1950/51–1951/52*, 1952 (98–105).

Includes notes on insects imported for the control of gorse, *Lantana*, and cactus as well as insect pests of field crops and orchards.

2614. **Proceedings of the sixth meeting, Eastern Section, National Weed Committee.** Laval University, Quebec. 1953. pp. 148. Many refs. O.R.E.

Papers of possible interest to the forester are (1) reports of brush control operations by different bodies (railways, hydro-electric commissions etc.), and (2) an account of chemical control of purslane in evergreen tree nurseries.

2615. **A test of borax control of goatweed (*Hypericum perforatum*).** *Res. Note Nth. Rocky Mt. For. Range Exp. Sta.* No. 134, 1953. pp. 5. 3 refs.

Commercial borax applied at 4 lb./square rod reduced goatweed cover and forb cover but increased grass cover. Shrub cover was generally reduced. Ponderosa Pine seedlings declined from 16 to 2 and 19 to 0 on the two treated areas. Needles of older trees, irrespective of age, were burnt, but some recovery was evident 3 years after treatment.

2616. JONES, I. E. **The control of riverbed growth.** *Proc. 5th nat. Weeds Conf. N.Z.* 1952 (40–2). O.R.E.

In the 1951–52 sprayings of sucker growth 3 lb. acid equivalent of 2, 4-D/acre were found preferable to the 2 lb./acre previously recommended. [Cf. *For. Abstr.* 13 (No. 1315).]

2617. WARBACH, O. **Control of Japanese Honeysuckle in wildlife borders.** *J. Wildlife Mgmt.* 17 (3), 1953 (301–4). 3 refs. B.A.P.

Spraying of a woodland margin in March with 1 gal. each of alkanolamine salt of 2,4-D and butyl ester of 2,4,5-T in 50 gal. diesel oil gave a complete kill of *Lonicera japonica*, 75% kill of *Smilax* sp. and 75% of *Rhus copallina*. The spray probably needs to be applied once every 2 years. A weak 2,4-D water spray applied to borders of *Lespedeza bicolor* while it is still dormant and the Honeysuckle beginning growth, affords adequate selective protection.

2618. CHAMPAGNE, E. G. **Covers protect small trees when spraying with herbicides.** *Sta. Note Cent. St. For. Exp. Sta.* No. 79, 1953. pp. 2.

Cone-shaped caps of building paper, sisalkraft paper or heavy wrapping paper can be used to protect trees from drifting spray or fumes from herbicides. The size of the cones will vary with the trees to be protected but cones less than 2 or over 4 ft. high are not practical. Covers should not be left on for more than 48 hr.

442. *Parasitic (Higher) Plants. Climbers and Epiphytes*

See also No. 2624.

2619. ROTH, L. F. **Pine dwarf-mistletoe [*Arceuthobium campylopodum* forma *typicum*] on the Pringle Falls Experimental Forest.** *Res. Note Pacif. Nthwest. For. Range Exp. Sta.* No. 91, 1953. pp. 3.

A more detailed account of a study already reported [see *For. Abstr.* 15 (No. 400)].

443. *Fungi and Bacteria*

2620. ***Pestalotiopsis theae* (Saw.) Stey.** *Distr. Maps Plant Dis.* No. 284 (rev.) 1954. pp. [2].

443.2. Diseases of Seed and Seedlings; Damping Off etc.

See also No. 2456.

2621. VERONA, O. Note sopra una malattia degli strobili di '*Pinus pinea*' prodotta da '*Sphaeropsis necatrix*'. [**A disease of *Pinus pinea* cones caused by *S. necatrix*.**] *Annali della Facoltà di Agraria, Pisa* (*n.s.*) 11, 1950 (193–6 + 1 plate). 17 refs. [It.it.f.g.e.] C.G.B.

A detailed study of the disease, including the biology and morphology of the causal agent. The disease is more serious in rainy years and in old and overcrowded stands.

2622. SALISBURY, P. J. **Some aspects of conifer seed microflora.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (3–4).

Assays of 23 seed samples, mostly from British Columbia, showed that many commercial lots of conifer seed have a large number of viable moulds (up to 10,000,000/g.), but no close correlation was found between high mould content and low viability of seed. The relatively heavy seed coats of many coniferous species appear to protect them from serious injury but there is evidence that moulds may penetrate Douglas Fir seed and may occur both internally and externally. The fungi most commonly found were *Penicillium* spp., *Mucor* spp., *Aspergillus glaucus*, and *Pullularia* sp. Experiments

showed that most of these could grow at temperatures of 5° C., i.e. roughly those at which conifer seed is usually stored in British Columbia. Growth of moulds would not be expected, however, in seed stored at a moisture content of 8% or less.

2623. Potlaičuk, V. I. Vrednaja mikroflora želudeĭ i ee razvitie v zavisimosti ot usloviĭ proizrastanija i hranenija. [**The harmful microflora of acorns and its development in relation to their origin and storage conditions.**] *Bot. Ž.* 38 (1), 1953 (135–42). 18 refs. [Russ.] C.G.B.

Reports on studies made in 1950–52, tabulating: (1) fungus species found on acorns still on the trees between July and Oct. in Leningrad and Voronezh provinces; (2) fungi causing decay in acorns during the period of collection and storage, as related to place of origin (34 different districts in the RSFSR, White Russia, Ukraine, and Mordvinian, Chuvash and Tartar republics); (3) % of infected acorns of 3 different origins during storage; (4) ditto as related to month of collection (Sept., Oct.). In general, it is concluded that the widespread and very numerous species of mould fungi which inhabit the surface of acorns or penetrate the superficial tissues (e.g. *Mucor*, *Rhizopus*, *Trichothecium*, *Botrytis* and *Penicillium* spp.) are of secondary importance in relation to loss of germinative capacity. The most injurious are those fungi that penetrate and destroy the tissues of the embryo, e.g. *Sclerotinia pseudotuberosa*, *Phomopsis quercella*, *Gloeosporium quercinum*, and *Cytospora intermedia*. If the storage conditions are poor, such fungi may spread seriously and infect large quantities of the stored acorns. The degree of infection by the main parasitic fungi varied widely in acorns from different regions, indicating the need for careful choice of seed source for the large quantities required by the shelterbelt programme. It is highly desirable that a competent mycological examination should be made of batches of acorns before storage.

443.3. Diseases of Older Stages

See also Nos. 2266, 2355, 2716–7, 2720.

Stem, Butt and Root Rots; Root Diseases

See also Nos. 2266–8, 2512–3, 2865.

2624. Minev, K. Bolesti na borot (*Pinus peuce*, Griseb.) i elata (*Abies alba*, Mill) vo šumata na nacionalniot park Pelister. [**Diseases of *P. peuce* and *A. alba* in the Pelister national park [Macedonia].**] *God. Zborn. zemj.-šum. Skopje* 4, 1953 (23–40 + 28 photos). 10 refs. [Maced.maced.e.]

The following diseases have been found on *P. peuce* trees: *Fomes pini*, cankers and swellings on stems and branches, witches-brooms of unknown origin, die-back of branches and loss of vigour. Diseases found on *A. alba* are: *Melampsorella caryophyllacearum*, *Viscum album* var. *abietis*, cankers and swellings on trees and branches, die-back of branches and loss of vigour of trees.

2625. Minev, K. Bolesti na divata foja *Juniperus excelsa*, Bieb. [**Diseases of *J. excelsa* [in Macedonia].**] *God. Zborn. zemj.-šum. Skopje* 4, 1953 (41–5 + 8 photos, 1 dgm.). 8 refs. [Maced.maced.e.]

Gymnosporangium sabinae and *Fomes juniperinus* have been found to attack *J. excelsa* in Macedonia. *F. juniperinus* causes severe damage in the heartwood of living stems.

2626. Gothe, H. Beobachtungen über Stockfäule in Schlitzer Lärchenbeständen. [**Butt rot in Schlitz Larch stands.**] *Forst- u. Holzw.* 9 (1), 1954 (11–3). 4 refs. [G.g.]

A four-year study was made in the Schlitz region to investigate factors affecting the occurrence of butt rot in Larch. Among about 1,650 Larches felled, 186 (11·3%) had butt rot. These were predominantly trees over 130 years old. The better site classes had a higher % of affected trees than the lower. No correlation was found between the occurrence of butt rot and composition of the stand (pure or mixed).

2627. Foster, R. E., Thomas, G. P., and Browne, J. E. **A tree decadence classification for mature coniferous stands.** *For. Chron.* 29 (4), 1953 (359–66). 6 refs. (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 100).

Trees were divided into 3 classes: (1) 'residual' with no external signs of decay, (2) 'suspect' with visible signs of decay (sporophores, frost cracks, scars, dead tops, rotten branches, forking, swollen knots, dwarf-mistletoe), and (3) dead. Results varied with species, and region but on the whole the classification promises to be useful in estimating cull in mature coniferous stands.

2628. Engelhardt, N. T. **Deterioration of looper-killed Western Hemlock on Lower Vancouver Island.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (4).

Fomes pinicola was found to be responsible for 87% of the volume of decay.

2629. Etheridge, D. E. **Decay of subalpine Spruce on the Rocky Mountains forest reserves in Alberta.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (3).

Gives data on cull in *Picea glauca*, *P. engelmanni* and *P. mariana*. The most important causal organisms were *Polyporus circinatus*, *Flammula connissans*, *Coniophora puteana*, *Fomes pini* (25% of total), *Stereum sanguinolentum* and 'Unknown M'.

2630. Hasan, S. M. **Heart rot in trees with special reference to the development of butt rot in [Sitka] Spruce.** *Pakistan J. For.* 3 (4), 1953 (178–85 + 2 plates). 21 refs.

Describes and discusses the results of, an investigation of 25 trees, 40 years old, growing in Britain on a shallow soil with badly drained subsoil. The root systems of 5 of the trees were excavated and examined, and the trunks sectioned and examined. Roots showed abnormal tissue, traumatic resin ducts, and various fungi. The stems also revealed a varied fungal flora in addition to rot fungi. It is supposed that the abnormal tissue in the roots is due to some sort of check during the process of differentiation, probably caused by the adverse soil conditions. The fungi found in the stems presumably entered through the diseased roots, since there were no visible wounds

above ground. It is noted that in any one tree a different set of fungi was found in stem and roots, which implies a certain competition between the fungi within the tree.

2631. Orłoś, H. Možnosti obrany proti václavce v horských smrčinách. [**Possibility of *Armillaria mellea* control in mountain Spruce forests.**] *Lesn. Práce* 32 (7), 1953 (319–21). [Cz.]

Describes the working programme of field research now being conducted in Poland. [Cf. *For. Abstr.* 15 (No. 1506).]

2632. Mańka, K. Badania terenowe i laboratoryjne nad opieńką miodową, *Armillaria mellea* (Vahl) Quel. [**Field and laboratory investigations on *A. mellea*.**] *Prace Inst. Bad. Leśn.* No. 94, 1953. pp. 96. 62 refs. [Pol.pol.russ.e.]

Presents the results of the 1948–50 field and laboratory investigations on the development of *A. mellea* in the Spruce stands near Andrychów in Poland. Mortality occurred in practically the whole area tested and in all age classes of Spruce, other species being immune. The disease was usually of chronic type but in acute cases the classical symptoms of *Armillaria* infection became manifest. The disease was obviously progressing, particularly in stands ca. 30 years old. Trees of different degrees of infection and different age classes showed dieback of the root-tips in the assimilative root zone; in 80% of cases, an unidentified fungus 'A125' was isolated from these root-tips. Sucrose was found to be a better carbohydrate source for *Armillaria* than glucose. The optimum medium for culture of 'A125' differs widely from that for *Armillaria*. 'A125' often accelerated the formation of rhizomorphs of *Armillaria*, the development of which was influenced, not only by 'A125' and temperature, but by the composition, structure, moisture content, and quantity of the medium.

2633. Buckland, D. C. **Observations on *Armillaria mellea* in immature Douglas Fir.** *For. Chron.* 29 (4), 1953 (344–7).

A. mellea was observed attacking all vigour classes in Douglas Fir plantations in Vancouver Island. In vigorous trees the infected part was occluded by resin and callus, forming a latent or dormant canker in which the fungus survived but did not spread. In less vigorous trees it caused the typical root-rot. Planting on shallow, stony soils, and malformation of roots due to faulty planting technique resulted in severe outbreaks of the disease.

2634. Marchionatto, J. B. *Phytophthora cinnamomi* sobre castaño en la Argentina. [***P. cinnamomi* on Chestnut in Argentina.**] *Rev. argent. Agron.* 20 (1), 1953 (4–6). 6 refs. [Span.] E.M.B.

P. cinnamomi was isolated from diseased *Castanea sativa* in the botanical garden of the Facultad de Agronomía y Veterinaria at Buenos Aires.

2635. Moreau, C., and Moreau, M. Étude mycologique de la maladie de l'encre du chêne. [**Mycological study on ink disease of Oak.**] *Rev. Path. vég.* 31 (4), 1952 (201–31). 6 pp. of refs. [F.] I.M.I.

[Cf. *For. Abstr.* 13 (No. 1333).] Describes the characteristics in culture of fungi isolated from diseased trees of *Quercus* spp. Compares *Phytophthora cinnamomi* and *P. cambivora*. Concludes that *P. cinnamomi* is the primary cause of the ink disease and that other fungi such as *Nectria* spp. cause the associated secondary cankers.

2636. Gomes, M. R. Marques, and Santos, A. C. dos. Uma nova espécie para o género *Chaetomium*. *Chaetomium lusitanicum* M. Gomes. [**A new species of *Chaetomium, C. lusitanicum*.**] *Estud. Inform. Serv. flor. aqüic. Portugal* No. 15–*C*3, 1953. pp. 8 + 2 plates. 8 refs. [Port.port.e.] Limited distribution.

The new species was isolated from roots of *Betula verrucosa*.

2637. Sproston, T., Jr., and Scott, W. W. ***Valsa leucostomoides*, the cause of decay and discoloration in tapped Sugar Maples.** *Phytopathology* 44 (1), 1954 (12–3). 9 refs.

A fungus isolated from decayed wood in tapped *Acer saccharum* was identified as *Valsa leucostomoides* or its *Cytospora* stage. This pathogen was isolated from 94% of the trees tested. It was also found that, under laboratory conditions, other *Acer* spp. and trees of several other genera can be infected with the *Cytospora* stage. It is suggested that to avoid infection, tap-holes should be sprayed with some protective material when the spouts are pulled out at the end of the tapping season.

2638. Silverborg, S. B. **Sterile conks of *Fomes igniarius* on Aspen.** *Phytopathology* 43 (12), 1953 (699–700).

Three sterile conks were found on recently killed, standing *Populus tremuloides* in New York state. The fungus was identified by cultural characteristics and by comparison with known isolates of *F. igniarius* from Quaking Aspen.

Wilts, Diebacks etc.

See also No. 2624.

2639. Capuano, E. Nota preliminare su una *Sphaeropsis* sp. del sorbo (*Sorbus domestica*). [**Preliminary note on a species of *Sphaeropsis* on *Sorbus domestica* [at Naples].**] *Notiz. Malatt. Piante* No. 21, 1952 (35–6, 71–2). [It.e.] I.M.I.

The infected trees (suffering from dieback) were found also to be infected with *Diplodia sorbi*.

2640. Liese, J. Pflanzenphysiologische Betrachtungen zum Ulmensterben. [**Physiological considerations in the mortality of Elms.**] *Arch. Forstw.* 1 (1/2), 1952 (59–70). 15 refs. [G.g.]

In the floodplains of the Oder and Elbe, the dying of Elms is referable to lack of floods plus the sinking of the water-table. The shallow root systems fail to adapt themselves to these changes. The moisture content of the wood is reduced and the sapwood is prematurely tylosed by indrawn air, being thus made incapable of conducting or storing water. The sapwood of felled trees frequently shows a dry condition in contrast with the water-saturated heart which, because it was laid down when water supplies were good, shows few tyloses. These predisposing causes render the weakened Elm particularly sensitive to the attacks of *Scolytus* spp. and *Ceratostomella ulmi*, since even the last available

passages for water will now be tylosed. Stems of root-sucker origin are also particularly susceptible, as their root systems lie above those of the parent and they have no connexion with groundwater. Seedlings with taproots may be more resistant, and for this reason the species should not be written off for such regions. Similar predisposing causes for this mortality are assumed to exist outside the floodplains, particularly as it is always specially marked some years after a period of drought. [Cf. *For. Abstr.* 14 (No. 2394).] *From author's summary.*

2641. MAŃKA, K. O przebiegu holenderskiej choroby wiązów (*Ceratostomella ulmi* (Schw.) Buisman) na terenie miasta Poznania. [**The progress of Dutch Elm disease (*C. ulmi*) in the area of Poznań, Poland.**] *Acta Soc. Bot. Polon.* 22 (2), 1953 (355–78). 11 refs. [Pol.e.] O.B.D.

Of the 2082 trees examined during 1946–49, 511 died. Highest mortality was suffered by *Ulmus glabra* and then *U. campestris*. Lowest losses were among *U. laevis*, which shows a distinct tendency to recover.

Cankers, Stem Rusts etc.

See also Nos. 2277, 2624.

2642. BAZZIGHER, G. Beitrag zur Kenntnis der *Endothia parasitica* (Murr.) And. [**Studies on *E. parasitica*.**] *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (2), 1953 (189–212 + 4 plates). 17 refs. [G.g.f.] Also in *Phytopathologische Zeitschrift* 1953.

The author's researches on *E. parasitica* have established the following: (1) *Fagus sylvatica* is susceptible to parasitization by this fungus. (2) There is no correlation between the age or thickness of a branch and the extent of the lesions (demonstrated on 8-year-old *Castanea sativa*). (3) The age of the inoculum affects the success and degree of infection; it has been shown that a malt-agar culture of the fungus experiences a definite decrease in virulence as it ages. (4) Wounds that penetrate to the cambium are particularly liable to cause infection, especially those due to crushing (e.g. by hail or logging damage). (5) Striking seasonal variations occur in the infection of Chestnuts, the greatest chance of infection occurring during and just after leaf flushing and the least in late autumn and winter. (6) Seasonal variation is also apparent in the proliferation of the fungus under the bark of infected trees, maximum growth occurring in the warmest months. (7) No correlation has been established between reaction of the tree and size of the lesion. (8) *E. parasitica* produces a toxic substance (conditions of production and method of isolation described) to which the provisional name diaporthine is given. The biological action of this toxin upon bacteria, fungi, and higher plants is defined, and the possibility discussed of finding new methods of controlling the disease, e.g. by inactivating the diaporthine.

2643. SCHÖNHAR, S. Untersuchungen über die Biologie von *Dothichiza populea* (Erreger des Pappelrindentodes). [**The biology of *D. populea*, cause of Poplar bark disease.**] *Forstwiss. Cbl.* 72 (11/12), 1953 (358–68). 6 refs. [G.]

In laboratory inoculation experiments on *Populus trichocarpa* and × *P. regenerata* it was ascertained that (1) the susceptibility of non-lignified side shoots and leaves to infection was practically nil, and (2) infection can enter through wounds that are surrounded by living bark tissue, but attack is not so severe as when the wound is surrounded by dead tissue. In all experiments × *P. regenerata* was more resistant to infection than *P. trichocarpa*. Field inoculations were made in April 1952 on species of the sections *Leuce*, *Tacamahaca* and *Aigeiros* and on Black and Balsam Poplar hybrids to find their relative susceptibility to the disease. By April 1953 it was found that *P. alba*, *P. alba* × *P. tremula* and *P. trichocarpa* were fairly severely attacked, whereas × *P. regenerata*, *P.* 'Bachelieri' and *P. generosa* × *P. nigra* were relatively lightly attacked. These results, were confirmed by further inoculation experiments made in Nov. 1952 and examined in April 1953. It was ascertained in the latter experiment that top wilting increases susceptibility to disease. Relative susceptibility therefore may be related to susceptibility to drought. Further field experiments confirmed that Poplars are more liable to be infected in winter than in summer.

2644. STEWART, D. M. **Factors affecting local control of White Pine blister rust.** *Abstr. of thesis*, in *Dissert. Abstr.* 13 (5), 1953 (614–5). [University of Minnesota.] O.R.S.

On one area, burned over 26 years before planting with *P. strobus*, rust was effectively controlled by one eradication of *Ribes* spp.; 12 years later, only 6·4% of trees had cankers. On a second area, burned over 1–2 years before planting, control by *Ribes* eradication was ineffective because of continual regeneration of the *Ribes*, and 27·5–67·5 of the trees on different sites had cankers. Planting of Pines and eradication of *Ribes* are both inadvisable on recently burned areas. Removal of cankers by pruning as an additional control measure was also tested. In young planted trees, infected branches were cut off when the canker was 6 in. from the trunk, branches were removed and the bark round the stub excised when the canker was nearer the trunk, and the top of the tree was lopped below the canker margin when the canker was on an upper main stem; after 3 years, 100% of trees in the first group, 69–100% in the second and 95% in the third were canker-free. On sapling-size natural forest trees, diseased limbs only, or all lower branches and those with cankers in the upper 5 whorls were removed; observations after 6 years indicated that the second method was more effective. In both planted and natural stands where *Ribes* can be effectively and cheaply removed, the removal of cankers may be economically justifiable.

2645. MOSS, V. D., and WELLNER, C. A. **Aiding blister rust control by silvicultural measures in the Western White Pine type.** *Circ. U.S. Dep. Agric.* No. 919, 1953. pp. 32. 11 refs.

Gives a detailed study of *Ribes* spp. Any form of partial cutting favours *Ribes* regeneration. Clear felling, followed by thorough burning and planting of Pine has the advantage of destroying *Ribes* seed stored in the litter layer and also favours the growth and establishment of *Pinus monticola*.

Foliage Diseases

See also No. 2625.

2646. D'Oliveira, A. L. Branquinho, and Pimentel, A. A. Lopes. Infecções latentes de *Melampsoridium betulinum* Pers. Kleb. em gomos de *Betula celtiberica* Rothm. et Vasc. [**Latent infections of *M. betulinum* in buds of *B. celtiberica*.**] *Estud. Inform. Serv. flor. aqüic. Portugal* No. 9–C3, 1953. pp. 3. [Port.port.e.] Limited distribution.

In Portugal *M. betulinum* has been found in great quantities on *B. celtiberica* in Trás os Montes. The pycnial and aecial stages of this rust (*Peridermium laricis*) are usually found on *Larix* spp., and the uredial and telial stages on plants of the genus *Betula*. Larch, however, is not common in Trás os Montes. In the laboratory it was found that this rust can overwinter in its uredial stages on buds of *B. celtiberica*, which become centres of infection the following spring.

2647. Ribaldi, M. Maculatura fogliare del nocciolo spontaneo causata da *Cylindrothyrium coryli* (*Leptothyrium coryli* Fuck.) n. comb., con osservazioni biologiche e sistematiche sul fungo. [**A leaf spot of *Corylus avellana* caused by *Cylindrothyrium coryli* (*Leptothyrium coryli* Fuck.) comb. nov., with notes on the biology and taxonomy of the fungus.**] *Ann. Sper. agr.* (*n.s.*) 7 (6), 1953 (1941–56 + 3 plates). 14 refs. [It.it.e.] C.G.B.

45. DAMAGE BY ANIMALS

2648. Hierholzer, O., *et al.* Taschenbuch des Forstschutzes gegen Tiere. [**Pocket book of forest protection against animals.**] Wirtschafts- u. Forstverlag Euting KG., Neuwied/Rh. 1952. pp. 164. [G.] Price [13*s.*]

A handy reference book, in loose-leaf form to allow for the insertion of periodical revisions and additions, dealing in condensed note form with the essential characters, biology, type of damage and control of the major forest pests in Germany—chiefly insects, but also including mammals and birds. The matter is arranged under the heads: nurseries; young plantations and thickets; pole stage and onwards. Each is then broken down primarily by site of attack (underground, stem, foliage). Blank forms are included for records of attacks and measures taken, and an appendix gives a monthly calendar of forest-protection work and a list of addresses of research institutions in W. and E. Germany dealing with animal pests of trees.

2649. Kalshoven, L. G. E. De plagen van de cultuurgewassen in Indonesië. [**Pests of crops in Indonesia.**] N. V. Uitgeverij W. van Hoeve, 's-Gravenhage. 2 vols. 1950–51. pp. 1065 + 14 + [7] + 16 plates. Many refs. [Du.] I.I.E.

The greater part of the work is devoted to insects, but there are also sections on Vermes (with a chapter by *J. van der Vecht* on eelworms parasitic on plants), Mollusca, Crustacea, Arachnoidea, and Myriopoda, Amphibia and Reptilia, Aves (by *A. C. V. van Bemmel*) and Mammalia (by *H. J. V. Sody*). There is a systematic list of host plants, including forest and plantation trees, showing the species that attack them and the nature of the damage. There is a combined index to scientific, Dutch and Javanese names of plants and pests. English legends to the numerous text figures and the plates are given in an appendix.

451. *Mammals*

2650. Milević, K. Zaštita šuma od koza u N. R. Srbiji. [**Protection of forests in Serbia from goats.**] *Šumarstvo* 6 (6), 1953 (537–46). [Serb.serb. e.g.]

An increase of the area under forest in Serbia is impossible with the existing goat population of nearly 300,000. Already there are some areas where no goats can be kept; a further reduction of the number is inevitable.

2651. Taylor, W. L. **Squirrels in Great Britain.** *Forestry* 27 (1), 1954 (63–8). 19 refs.

The distribution in 1953, and the habits, of the two squirrels *Sciurus vulgaris leucourus* and *S. carolinensis* are discussed and their control considered.

2652. Squillace, A. E. **Effect of squirrels on the supply of Ponderosa Pine seed.** *Res. Note Nth. Rocky Mt. For. Range Exp. Sta.* No. 131, 1953. pp. 4. 2 refs.

A preliminary study of damage in W. Montana showed that squirrels cut 60–89% of the current cone crop and many of the one-year conelets in 1951–53, poor to fair seed years. Nailing a 20-in.-wide aluminium band round the trunks of isolated trees at a height of about 5–7 ft. was effective in keeping squirrels out, but the method needs further investigation. [Cf. *For. Abstr.* 14 (No. 3507).]

2653. Wachendorff. Zu: Wühlmausbekämpfung mit der Herzschen Patrone. [**Further to 'Control of *Arvicola terrestris* with the Herz fumigating cartridge'.**] *Forst u. Holz* 8 (22), 1953 (329). [G.]

[Cf. *For. Abstr.* 15 (No. 1544).] Points out that success can be expected with this device only when conditions favour the building up of a sufficient gas concentration in habitually frequented runs of *A. terrestris*.

2654. Liebeneiner, E. Ein Vergleich der Wirkung einiger Waldverbissmittel. [**Comparative effects of some animal repellents.**] *Forst u. Holz* 8 (24), 1953 (353–4). [G.]

Trials with 3 different repellents (Arbinol, Coniferol and HT1) proved none to be entirely satisfactory.

2655. Vaněk, J. Ohodnocení smrku jako dřeviny, která slouží ochraně listnáčů proti okusu zvěří. [**Appreciation of Spruce as a species protecting broadleaved trees against game browsing.**] *Lesn. Práce* 32 (7), 1953 (300–5). [Cz.]

Presents results of 995 measurements of the % of young Beech and Lime browsed by game and of their height increment as a function of lateral protection by Spruce. Graphs show that the greater this protection, the less the damage and the greater the height growth. Describes the technique of using Spruce for this purpose, in particular the necessity

for checking its growth by controlling the illumination and by topping, and by suitable spacing of the plants to be protected.

2656. KREFTING, L. W., and STOECKELER, J. H. **Effect of simulated snowshoe hare and deer damage on planted conifers in the Lake States.** *J. Wildlife Mgmt.* 17 (4), 1953 (487–94). 10 refs. B.A.P.

Two sets of experiments were made (1) in the Nicolet National Forest in north-eastern Wisconsin, and (2) in the Hugo Lauer nursery. Clippings were made on 3 species of Pine and on *Picea glauca*, simulating damage done by *Lepus americanus* and *Odocoileus virginianus*. Some groups were clipped once only, some once a year for 2 or 3 years in succession, and others were clipped once and allowed a year of rest before clipping once again. Age classes represented were 1 + 0 and 2 + 0 *Pinus banksiana*, 2 + 0 and 2 + 1 *P. resinosa*, 2 + 0 and 2 + 1 *P. strobus* and 2 + 2 *Picea glauca*. *P. resinosa* proved the most sensitive, with high mortality and height losses especially among the 2 + 0 stock. *P. strobus* ranked second in sensitivity. *P. banksiana* was more resistant, because of its ability to form a new leader from an internodal bud. *Picea glauca* was the most resistant of all, having a good scattering of such buds. The effects of clipping on survival and height growth varied greatly with age class. In general, height growth was affected more than survival. None of the trees treated developed multiple stems. The experiments demonstrated that it is advisable to use the older planting stock where damage from white-tailed deer or snowshoe hare may occur.

2657. ROBINSON, W. B. **Coyote control with compound 1080 stations in national forests.** *J. For.* 51 (12), 1953 (880–5). 18 refs. [E.e.]

This compound, deadly to canines, was applied in a coyote control study at the rate of one meat-bait station per 'township' [? 36 sq. miles]. The danger to martens,weasels, minks, red foxes, bears and birds varies with extent of home range, preferred cover type, foraging habits, seasonal migration, tolerance to toxicity and opportunity to eat vomitus. With the locally appropriate precautions no serious damage is likely to populations of martens, weasels or minks at this rate of baiting. The red fox and the coyote, however, range the same ground in the mountains and special difficulties in control arise there.

452. *Birds*

2658. NOTINI, G., and VESTERBERG, R. Några synpunkter på kloralos som medel i kampen mot de skadegörande kråkfåglarna. [**The use of chloralose in the control of harmful Corvidae.**] *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953 (19–34). 18 refs. [Sw.sw.e.]

The use of a narcotic, which would allow keepers to kill the harmful birds while they were stupefied and leave other wildlife to recover, would be useful not only in game management but in plant protection. In preliminary trials the French Corbodor (β-chloralose) was, however, found to have strong toxic effects; α-chloralose gave better results but needs further trial.

453. *Insects*

See also Nos. 2240, 2613.

2659. QADRI, M. A. H. **Some of the unknown and little known forest pests of North Western Himalayas.** Manager of Publications, Karachi. 1953. pp. 16. 4 refs. Price *Rs.*1. *as.*12.

Describes damage caused to different tree species by 21 species of insects.

2660. RAWLINGS, G. B. **Insects of *Pinus radiata* forests in New Zealand.** *For. Res. Notes N.Z. For. Serv.* 1 (8), 1953 (1–19). 17 refs.

An annotated list.

2661. ŠČEPOTJEV, N. V. K voprosu o hozjaĭstvennom značenii prytkoĭ jaščericy (*Lacerta agilis exigua* Eichw.) v polezaščitnyh lesnyh polosah. [**The economic importance of *L. agilis exigua* in field shelterbelts.**] *Zoologičeskiĭ Žurnal, Moskva* 31 (4), 1952 (574–83). 27 refs. [Russ.russ.] I.I.E.

Gives brief accounts, partly from literature, of the distribution, habitat preferences and local migrations of this lizard, and results of studies of its food in Saratov Province, based on numerous analyses of stomach contents. The lizard is moisture-loving and hence in the steppe zone it colonizes shelterbelts in abundance—coming in as early as the 2nd and 3rd year after formation, much earlier than insectivorous birds. Its diet consists chiefly of insects of many families, and spiders. Woodlice, worms and millipedes are also eaten in small quantity. Of the total number of animals found in the stomachs, insects made up ca. 88%, and harmful insects an average of 47% (up to 65% in 1940). The bulk of the latter were Acrididae (9%), Chrysomelidae (5%), Curculionidae (5%) and various lepidoptera (18%). The proportions varied with the biotope, e.g. Chrysomelidae were more frequent in stomachs from the forest-steppe zone, Curculionidae in those from the steppe proper. These facts are important since Acrididae and other field-crop pests congregate and lay eggs in and along the margins of shelterbelts. It is estimated that 50–60 lizards per km. of belt can successfully control pests along a strip of field 10–20 m. wide. Results of some laboratory feeding trials are given briefly.

2662. FRIC, F. Opomíjený způsob ochrany lesa. [**An ignored method of forest protection.**] *Lesn. Práce* 32 (11), 1953 (514–22). [Cz.]

Lists 37 species of birds nesting in tree hollows, with their relative frequency in Czechoslovakia, times of nesting and preferred nesting sites, and indicates the types and dimensions of nesting boxes to be erected in different places to encourage the insectivorous birds to settle there. Sixteen types of box are described and illustrated.

2663. HOCKING, K. S., and YEO, D. **Aircraft applications of insecticides in East Africa. I. Preliminary experiments in areas supporting populations of the tsetse fly (*Glossina palpalis* (R.-D.)).** *Bull. ent. Res.* 44 (3), 1953 (589–600). 6 refs. [Colonial Insecticide Research Unit, Arusha, Tanganyika.]

Describes preliminary experiments in applying coarse sprays and coarse aerosols from aircraft over dense forest. At the dosages used, both proved

relatively ineffective; the sprays failed to penetrate the canopy and much of the aerosol also was filtered out by the upper layers. In addition, meteorological conditions in the area were unsuitable for the application of aerosols, much of the insecticide being blown away from the treated area. It was concluded that aircraft applications of insecticide for control of *Glossina palpalis* are expensive and comparatively ineffective. *From authors' summary.*

2664. Hocking, K. S., Parr, H. C. M., Yeo, D., and Robins, P. A. **Aircraft applications of insecticides in East Africa. II. An experimental attempt to produce a fly-free corridor through a belt of tsetse-infested woodland.** *Bull. ent. Res.* 44 (3), 1953 (601–9). 4 refs.

An area 2 miles wide and 4 miles long was treated with a coarse spray of 4·6% solution of DDT in Shell Diesoline at a rate of 0·5 gal./acre. Seven applications were made at intervals of about 2 weeks. By the end of the experiment the fly density had fallen to a very low level and the area remained virtually free of flies for another 2 months. An examination of the data suggests that the fly population was maintained largely by immigrant flies, and was subject to wide variations. It seems certain that the effect of the applications would have been considerably less upon a stable and self-supporting population. The drop spectrum of the ground deposit had a mass median diameter of 0·35 mm., and the recovery of insecticide in the area was ca. 60%. Leeward and under sides of obstacles did not receive a dose. *From authors' summary.*

2665. Thompson, B. W. **Aircraft applications of insecticides in East Africa. III. Atmospheric turbulence in woodland.** *Bull. ent. Res.* 44 (4), 1953 (611–26). 8 refs.

Describes an attempt to determine the best conditions for achieving maximum saturation and persistence of small droplet insecticide in a type of African woodland. When winds outside the stand are nil or light, there occurs, under moderately dense woodland canopies, an almost continuous, slow transfer of air between the canopy and the ground, these movements tending towards laminar or sheet flows. With stronger winds the air movements become erratic and turbulent, although the denser the canopy the less the turbulence. During the day time there occurs a notable horizontal movement of air towards clearings where convection is at a maximum. Persistence, high saturation and good distribution will be achieved when conditions are calm outside the stand. The lighter the canopy however, the smaller the air movements, so that good results can be achieved, under light canopy, by aircraft applications relying upon sedimentation of the insecticide. Very dense canopies could probably be satisfactorily treated from the ground even during the highest lapse period of the tropical day. *From author's summary.*

2666. Grandori, R. La cianamide insetticida sistemico. [**$CaCN_2$ as a systemic insecticide.**] *Ital. agric.* 90 (12), 1953 (850–2). [It.] E.M.B.

It was found that larvae of *Melasoma* [*Chrysomela*] *aenea*, and *Nematus septentrionalis* either died or ceased feeding after sampling leaves taken from twigs of *Alnus viridis* that had stood for 16–26 hours in 0·3–0·6% solutions of pure $CaCN_2$. Similar results were obtained with *Galerucella luteola* and *Lithocolletis alniella* on twigs of *A. viridis* and *U. campestris* standing in 0·5–0·6% solutions.

2667. Sinreich, A. Über die Wirkung neuzeitlicher Insektizide auf die Gliedertiere bei Forstschädlingsbekämpfungen. [**The effect of modern insecticides upon arthropods during operations for forest insect control.**] *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (153–65). 7 refs. [G.]

During chemical control operations against 4 major forest insect pests in Austria, at various times from 1949 to 1951, collections were made of dead and moribund arthropods caught by the collecting sheets stretched under the trees for sampling the kill of the pest itself. The insecticides concerned were 5% Gesarol [DDT], E 605, 5% Gammexane [γ BHC], Cit 20 and Cit 7½% [BHC], all as dusts, and HCHN 20 [BHC] as a fog. Lists are given of the species of arthropod killed, in 4 degrees of frequency, in each operation and for each insecticide. A tabular conspectus shows the tree species, pest, and insecticide involved, area treated and month of treatment, with figures for the total numbers of arthropod species found on the collecting sheets, grouped as harmful or useful, and by natural orders. It is noted that not many Carabidae were killed, but Coleoptera in general, and especially Curculionidae, were frequent among the casualties.

2668. Stute, K. Ein Beitrag zur Wirkung des 'Toxaphen-Staubes' auf Bienen. [**The effects of Toxaphene dust on bees.**] *Anz. Schädlingsk.* 27 (2), 1954 (28). 5 refs. [G.]

Field experiments undertaken by the Bundesforschungsanstalt für Kleintierzucht, Celle, in 1953 showed that bees were unharmed by Toxaphene dusts.

2669. Wasserburger, H.-J. Ausgewählte Kontaktinsektizid-Vergiftungsfälle bei Mensch und Tier. [**Selected cases of poisoning in humans and animals through contact insecticides.**] *Anz. Schädlingsk.* 27 (1), 1954 (9–11). 57 refs. [G.]

Lists 23 human cases and 9 of domestic animals, with a bibliography on the subject.

Isoptera

See Nos. 2675, 3011.

Thysanoptera

See also No. 2675.

2670. Nolte, H.-W. Beiträge zur Morphologie und Biologie des Lärchenblasenfusses (*Taeniothrips laricivorus* Krat.). [**The morphology and biology of *T. laricivorus*.**] *Beiträge zur Entomologie, Berlin* 1 (2), 1951 (110–39). 23 refs. [G.g.] I.I.E.

Hemiptera

2671. Smereka, E., and LeJeune, R. R. **Leafhoppers attacking Poplar.** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (2).

The following leafhoppers have been collected from Poplars in the Prairie Provinces, where they

cause considerable damage: *Idiocerus lachrymalis*, *I. suturalis*, *Oncometopia lateralis*, *Macropsis* sp., *Oncopsis* sp., and *Agallia* sp.

2672. Nicol, J. **Action of systemic insecticides on the psyllid *Phytolyma lata*.** *Nature, Lond.* 173 (4392), 1954 (36–7). [West African Cacao Research Institute, Tafo, Gold Coast.]

Seedlings of *Chlorophora excelsa* were protected from attack by these gall-forming insects when the soil was watered with a dilute solution of Hanane containing 1% of *bis*-dimethylamino fluorophosphine oxide.

2673. Hašek, J. Mšice *Gilleteella cooleyi* Gill., škůdce douglasek na skolním lesním závodě LF VŠL, Brno. [***G. cooleyi* damages Douglas Fir in the experimental forest of the Forestry Department, Building Institute, Brno.**] *Lesn. Práce* 32 (11), 1953 (522–3). [Cz.]

The aphids were first observed on Douglas Fir on the margins of a mixed stand in Czechoslovakia in 1953.

2674. Cumming, M. E. P. **Notes on the life history and seasonal development of the Pine needle scale, *Phenacaspis pinifoliae* (Fitch) (Diaspididae: Homoptera).** *Repr.* from *Canad. Ent.* 85 (9), 1953 (347–52). 3 refs. (*Contr. Div. For. Biol. Dep. Agric. Can.* No. 90.)

Lepidoptera

See also Nos. 2388, 2628.

2675. Edwards, J. P. **Other injurious insects.** *Rep. For. Adm. Malaya 1952*, 1953 (14).

Cossid moths (*Zeuzera coffeae*) were found attacking the boles and branches of young saplings and older trees of *Eucalyptus deglupta*, *Cinnamomum camphora*, *Tectona grandis*, *Albizzia falcata*, *Swietenia* sp., *Terminalia* sp., and *Ochroma lagopus*. Infestation was controlled by injection of *o*-dichlorobenzene into the holes, which were subsequently plugged with plasticine. Severe attack by thrips on a number of trees of *Mesua ferrea* was partially controlled by spraying with a solution of Agrocide dispersible powder, which was also effective in controlling bagworms (Psychidae) on young *Dillenia* sp. Some measure of control of ants (*Crematogaster* sp.) on young *Podocarpus teysmannii* was effected by the use of a 0·5% spray of Dieldrex (a chlorinated hydrocarbon), which was also effective against subterranean termites.

2676. Roberti, D. Contributo alla conoscenza dell'*Hyponomeuta rorellus* Hb. [**A note on *H. rorellus*.**] *Bollettino del Laboratorio di Entomologia Agraria, Portici* 11, 1952 (220–33). 5 refs. [It.it.e.] I.I.E.

Describes adults, larvae and pupae of this species, collected on *Salix viminalis* and *S. incana*.

2677. Webb, F. E. **An ecological study of the Larch casebearer, *Coleophora laricella* Hbn. (Lepidoptera: Coleophoridae).** *Abstr. of thesis*, in *Dissert. Abstr.* 13 (5), 1953 (615–6). [University of Michigan.] O.R.S.

Distribution, life history, factors regulating populations, population studies and extent of damage.

2678. Zocchi, R. Contributi alla conoscenza degli insetti delle piante forestali. II. Note biologiche sull'*Evetria buoliana* Schiff. (Lepidoptera: Tortricidae). [**Forest insects. II. Biological notes on *Rhyacionia buoliana*.**] *Redia, Firenze* (*Ser. 2*) 37, 1952 (345–69). 31 refs. [It.it.] I.I.E.

Describes the life history and parasites of the insect and damage caused by it.

2679. Jahn, E. Parasiten des grauen Lärchenwicklers (*Grapholitha diniana*) und der mit ihm vergesellschafteten Insekten in Tirol im Jahre 1948. [**Parasites of *Semasia diniana* and of insects associated with it in the Tirol, 1948.**] *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (147–52). 5 refs. [G.g.]

Lists the parasites found in *S. diniana*, *Coleophora laricella* and *Zygaena filipendulae*, emphasizing the differences in relative specific composition as compared with the previous year. [Cf. *For. Abstr.* 12 (No. 1619).]

2680. Blais, J. R. **The recurrence of Spruce budworm infestations in the past century in the Lac Seul area of northwestern Ontario.** *Ecology* 35 (1), 1954 (62–71). 8 refs.

Evidence that a widespread and destructive outbreak occurred in the latter half of the 19th century in north-western Ontario was gained from the characteristic reduction of the annual-ring increment in old White Spruce and by the age-class distribution of Balsam Fir. The past outbreak had its centre of origin in the Sioux Lookout area and spread over 10,000 sq. miles in about 7 years.

Conditions similar to those found in the wake of several recent outbreaks seem to have prevailed 85 years ago, namely, that nearly all the Balsam Fir trees of merchantable size were killed, but many of the seedlings and some saplings survived. The large number of Balsam Fir that became established before the infestation of 1865 demonstrate that extensive stands of seed-bearing Fir existed at that time. These parent trees were destroyed during the past infestation and it was not until recent years, when their progeny reached maturity, that budworm populations again reached epidemic proportions.

Since the forest in this area had never been subjected to exploitation, all changes in the forest composition and all related phenomena are entirely natural. Budworm outbreaks, therefore, appear to be a phase in a natural cycle of events associated with the maturing of Balsam Fir. *From author's summary.*

2681. Zinna, G. Su un attacco di *Dioryctria splendidella* H.S. in provincia di Benevento. [**An outbreak of *D. splendidella* [on *Pinus halepensis*] in the province of Benevento.**] *Bollettino del Laboratorio de Entomologia Agraria, Portici* 10, 1950/51 (98–107). 18 refs. [It.it.e.] I.I.E.

Damage was caused to young Pine plantations. This is the first record of this pest in South Italy.

2682. Ripley, L. B., and Webb, D. v. V. **Aerial spraying against Wattle bagworm—directions for Wattle growers.** *Fmg. S. Afr.* 28 (330), 1953 (321–2). E.M.B.

Short notes on surveying, and guidance for pilots.

2683. Sullivan, C. R., and Wellington, W. G. **The light reactions of the larvae of the tent caterpillars, *Malacosoma disstria* Hbn., *M. americanum* (Fab.), and *M. pluviale* (Dyar) (Lepidoptera: Lasiocampidae).** *Repr.* from *Canad. Ent.* 85 (8), 1953 (297–310). 6 refs.

At room temperatures, larvae of all 3 species are photopositive to discrete or diffuse sources of light. Starvation emphasizes this response. When the larvae get overheated they become photonegative except in the case of the later instars of *M. americanum* and *M. pluviale*, which become more strongly photopositive. On the ground, exposed to full sunlight or a clear sky, older larvae of all 3 species become photonegative when overheated. Differences in response to diffuse light and to that from an open sky are probably due to the fact that the diffuse light is unpolarized.

2684. Mariconi, F. A. Menezes, and Lordello, L. G. E. Uma praga florestal, *Arsenura xanthopus* (Walker 1855). **[*A. xanthopus*, a forest pest.]** *Biológico* 19 (10), 1953 (175–81). 4 refs. [Port.e.] C.G.B.

Describes *Arsenura xanthopus*, an insect found infesting *Luehea divaricata* in Piracicaba. There are 3 natural parasites of this species, 2 of which, *Tetrastichus* sp. and *Winthemia tricolor*, would be useful in biological control operations. In laboratory experiments with insecticides, most success was obtained with DDT powders containing 0·25% active principle.

2685. Crooke, M. **The Pine looper moth.** *Quart. J. For.* 48 (1), 1954 (36–8).

A brief description of *Bupalus piniarius* and its life cycle and an account of a severe outbreak in Staffordshire.

2686. Schwenke, W. Untersuchungen zum Massenwechsel der Kiefernspanner *Bupalus piniarius* L. und *Semiothisa liturata* Cl. auf vergleichend-biozönotischer Grundlage. **[Fluctuations in populations of *B. piniarius* and *S. liturata* on a comparative biocoenotic basis.]** *Beiträge zur Entomologie, Berlin* 2 (1), 1952 (1–55). 27 refs. [G.g.] I.I.E.

The difficulty of making statistical analyses of insect populations at low densities is an important factor in studies of the causes of outbreaks. The author suggests that valuable information on fluctuations may be obtained by studying populations in comparative environments. An investigation was made of numbers of *Bupalus piniarius* and *Semiothisa liturata* in relation to the biocoenotic forest type, age of stand, and stand microclimate in a Pine area near Berlin. The results are presented and the author concludes that valuable information may be obtained by comparing pupal counts, provided that these are made in stands of the same age in similar biocoenotic forest types, and that the sampling areas reflect the composition of the whole stand.

2687. Bovey, P. Un nouveau ravageur en Europe: l'écaille fileuse (*Hyphantria cunea* Drury). **[A new pest in Europe: *H. cunea*.]** *Schweiz. Z. Forstw.* 105 (1), 1954 (1–12 + 2 plates). 9 refs. [F.g.]

A short account of the life history, hosts, and rapid spread in Europe. [Cf. *For. Abstr.* 15 (No. 481).]

2688. Böhm, H. Ein neuer Schädling in Österreich. **[A new pest in Austria.]** *Pflanzenschutzberichte, Wien* 7 (11/12), 1951 (177–89). 9 refs. [G.g.e.] I.I.E.

Hyphantria cunea was found in Austria for the first time in 1951 in the neighbourhood of Vienna, in parts of Burgenland and in lower Austria. Up to 45 hosts of this pest in Austria have been observed. The results of laboratory control experiments are reported with DDT, BHC and parathion. All were effective, particularly the dusts, against the early larval stages, but only partially effective against the later stages.

2689. Schimitschek, E. Der amerikanische Webebär *Hyphantria cunea* Drury in Österreich. **[*H. cunea* in Austria.]** *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (9–29). 8 refs. [G.g.]

Reviews the spread of *H. cunea* in Europe, with a map giving its distribution in Austria in 1951. Gives descriptions of all its life stages and its life history, together with notes on hosts and economic importance, parasites (hardly any as yet in Europe) and control. In preliminary trials of insecticides against this pest on roadside trees in Burgenland, both E 605 'forte' (0·04 and 0·08% sprays) and E 605 dust gave a 98% kill of the older and even of the full-grown larvae in Sept. 1951. It is difficult to achieve chemical control of the younger larvae while they are still in their nests, and the best measure at present is to cut off and destroy the nests.

2690. Webb, D. v. V. **An ecological study of the Wattle looper.** *Fmg. S. Afr.* 28 (332), 1953 (385–90). 10 refs. E.M.B.

Observations on the distribution of *Achaea lienardi* in Africa, damage by the larvae to Black Wattle, Castor Oil Plant, Eucalypts and other species, damage by adult moths to fruit, the life cycle of the insect and larval outbreaks in Natal and Zululand, with an accompanying map. A study of habitats and of the periodicity and pattern of outbreaks suggests that the insect largely dies out in the cooler Wattle areas after the autumn, because of the unfavourable food and climatic conditions. In the optimum habitat along the sub-tropical coastal belt it may live precariously until spring, and a low, widely dispersed population survives. When conditions are favourable an outbreak may develop, the moths either emigrating individually along the warm river valleys or first concentrating in favourable areas. Successful control of larvae in Castor Oil plantations has been obtained with 20% Toxaphene or 10% DDT dusts, both applied at 15 lb./acre. Good results were also obtained with *p-p*-DDT (16·7–20%) and Toxaphene (57% concentrate) emulsions, applied from aircraft at ½ gal. emulsion concentrate in 1½ gal. water/acre.

2691. Šilova-Krassova, S. A. Pticy v borjbe s vrediteljami sosny. **[Birds in the control of pests of Scots Pine.]** *Priroda, Moskva* 42 (9), 1953 (116–7). [Russ.] A.P.B.

During an outbreak of *Panolis flammea* on 20-year Pine plantations in the Khoper reserve, Voronezh, in Aug.-Sept. 1951, the density of pupae in the litter was 60–70 or more per sq. m. At this time many birds were noticed in the area—chiefly blackbirds, which picked over the litter for the pupae. Observation of an area of 2800 sq. m. showed that the birds were working on 335 sq. m. or 11·9% of the area. Litter samples taken from the latter showed a total of 14 healthy pupae in 12 samples, compared with 85 in the same number of samples from areas where the birds were not feeding. Pupae parasitized or infected by fungus diseases, were not eaten.

2692. Roonwal, M. L. **Unusual population eruption of the moth, *Lymantria mathura* Moore, in autumn.** *Curr. Sci.* 22 (12), 1953 (384). A.P.B.

Large numbers of ♀ moths were found ovipositing in Sept. 1953 in the New Forest Estate near Dehra Dun. In normal years the moths are not common in this region.

2693. Picco, D. Lotta chimica contro la processionaria del pino (*Thaumetopoea pytiocampa* [sic] Schiff.). [**Chemical control of *Thaumetopoea pityocampa*.**] *Notiz. Malatt. Piante* No. 21, 1952 (1–8, 21). [It.e.] I.M.I.

The most effective method of many tested was injection of a petrol solution of 5% paradichlorbenzene into the nests, which gave 100% control.

Coleoptera

See also No. 2241.

2694. [**Various injuries to *Acacia arabica*.**] *Rep. For. Dep. Sudan 1951/52*, 1953 (9).

In Gezira Circle growth of Sunt (*Acacia arabica*) in riverain forests was satisfactory except where dense grass interfered with regeneration. Damage by the shoot-borer *Agrilus discoloriformis* occurred in some places. On the White Nile, the filling of the Jebel Aulia reservoir is having its effect on the natural Sunt forests: the old forests on the lower contours are dying back but the tree is establishing itself at higher levels.

2695. Böhm, O. Zur Kenntnis des roten Weidenblattkäfers, *Melasoma saliceti* Wse. (Col., Chrys.). [**Notes on *M. saliceti*.**] *Pflanzenschutzberichte, Wien* 6 (5/6), 1951 (77–87). 22 refs. [G.g.e.] I.I.E.

Notes on habits and life history of this pest of Willow and Poplar in Austria.

2696. Kamp, H. J. Der Halsgrubenbock, ein gefährlicher Holzschädling. [***Criocephalus rusticus*, a dangerous wood pest.**] *Holz-Zbl.* 79 (152), 1953 (1626). 6 refs. [G.]

Describes the attack of *C. rusticus* on *Pinus strobus* in Germany. One tree (d.b.h. 40 cm.) was infested from ground level to a height of 50 cm., another, 60 years old, showed infestation from ground level to 2 m., the tunnels penetrating to a depth of 15 cm. and reaching into the heartwood.

2697. Sinreich, A. Der Käferfrass des grossen Pappelbockes, *Saperda carcharias* L. [**The feeding pattern of adults of *S. carcharias*.**] *Mitt. forstl. VersAnst., Mariabrunn* 48, 1952 (168–70). [G.]

Gives photographs and a drawing of the holes eaten in Poplar leaves. Holes due to feeding by beetles of this species may be recognized by their serrated margins.

2698. Zocchi, R. Contributi alla conoscenza degli insetti delle foreste. I. *Cryptorrhynchus lapathi* L. (Coleoptera Curculionidae). [**Notes on forest insects. I. *C. lapathi*.**] *Bollettino dell'Istituto di Entomologia della Università degli Studi di Bologna* 18, 1950–51 (1952), (245–58). 40 refs. [It.it.] I.I.E.

Morphology, life history, damage and possible methods of control.

2699. Richter, G. Moderne Verfahren der Rüsselkäferbekämpfung unter besonderer Berücksichtigung von Graurüsslerschäden. [**Modern methods of weevil control with special reference to *Strophosomus rufipes* and *Cneorrhinus plagiatus* damage.**] *Arch. Forstw.* 2 (1), 1953 (59–81). 27 refs. [G.g.]

Collection and destruction of weevils should be subordinated to the direct protection of the plant. Highly concentrated DDT sprays give at least 3 months' protection. Narrow control trenches (20 m. × 1 spit, with 4 pitfalls) properly placed and maintained will give the necessary warning of increasing weevil densities. In new plantations, 'preservative' treatment (spraying plants 14 days before field planting or plunging their shoots in Ektolit (DDT) at lifting) is simple and sure though not yet field-tested. 'Protective' measures must be early, preferably at planting in the spring. As a standard, spraying with 1–3% Ektolit extra 20 is recommended. Dusts are not effective except on *Brachyderes* in older plantings. A special look-out should be kept for *Brachyderes* attack on broadleaved regeneration in autumn and spring when the trenches should be watched. *Hylobius abietis*, *Coniocleonus glaucus*, and *Brachyderes incanus* were also included in tests on the persistence of sprays, the effectiveness of dusts, and the systemic value of soil and root treatment applied 5–9 months previously against cockchafer attack (positive effect e.g. with Verindal (BHC) dust—100 mg./root system or 500 mg./hole). Field spraying and dusting against 6 attacks of *Cneorrhinus* and 4 of *Strophosomus* is described with costs.

2700. Baldwin, H. I. **Prevention of bark beetle attack in conifers.** *Fox For. Note* No. 51, 1953. pp. 2.

Recommends silvicultural methods of preventing attack, and spraying with BHC undamaged trees near those already attacked by beetles.

2701. Merker, E., and Sattler, G. Biologische Beobachtungen am Fichtenbastkäfer, *Hylastes cunicularius*, sowie Notizen über den *Dryocoetes autographus*. [**Biological observations on *H. cunicularius*, with notes on *D. autographus*.**] *Allg. Forst- u. Jagdztg.* 123 (5), 1952 (135–43). 31 refs. [G.g.]

A report on recent observations in the Schwarzwald, where the present outbreak of *H. cunicularius* appears to have developed on the numerous stumps of trees felled as a result of attack by *Ips typographus*. Fresh stumps of trap trees and wind or snow

breakage continue to supply breeding sites. The beetle breeds in stumps and their roots down to finger thickness. Primary feeding, however, is on young Norway Spruce up to 10 years old. It can be much relieved by using trap billets. Larch, Douglas Fir, Scots Pine and *Picea pungens* have sometimes, but rarely, been attacked; broods have also been found in Silver Fir posts and adult feeding on Silver Fir plants. Adults may appear on sunny days as early as March; feeding begins at temperatures of 7–9° C. and the construction of brood tunnels at 8–9°, but swarming flights occur only when 20° is reached, in April–May. After this, however, tunnelling and development of the brood can proceed even if temperature again drops to 8–9°. The beetle flies little and is slower than *Ips typographus*, even in feeding. The first generation is completed in July and attacks on young plants continue from then until the frosts. When conditions are favourable, the second beetle generation appears just before the frosts, but it is frequently not complete and both beetles and larvae (more rarely pupae) overwinter—the adults on stumps, billets and Spruce plants. Trap billets treated by dipping in Gesarol 50 [a DDT preparation] 1 kg./100 litres + 250 g. sticker, and almost buried in the soil, on 20 June, proved quite ineffective for control of the beetles.

Dryocoetes autographus, which breeds in the same material as *H. cunicularius* and also feeds on young Spruce, was found by 6 Aug. in trap billets put out on 23 July; eggs had been laid and a few larvae had hatched out. By 19 Aug. the larvae were full grown. On 6 Sept. larvae were making pupal cradles or had already pupated, and by the end of the month numerous young adults were emerging. There are two generations. Young broods were found in Sept. and mid-Oct. in stumps.

2702. Martínek, V. Methody boje proti kůrovcí *Ips typographus* v Polsku. [**Methods of *I. typographus* control in Poland.**] *Lesn. Práce* 32 (7), 1953 (316–8). [Cz.]

Describes two main methods used in Poland: (1) mass use of trap trees, and (2) use of a small number of control trap trees for an early diagnosis of all the features of the pest outbreak.

2703. Yeager, L. E., and Riordan, L. E. **Effects of beetle-killed timber on range and wildlife in Colorado.** *Trans. N. Amer. Wildlife Conf.* No. 18, 1953 (596–616). 13 refs. B.A.P.

Fifty sample plots were set up in 1949, and 50 more in 1950, in typical Spruce/Fir stands, in order to estimate the effects on vegetation and wildlife of large areas of standing Engelmann Spruce killed by the barkbeetle *Dendroctonus engelmanni*. Half the plots were set up in living and half in dead forest. Ground cover was greatest among dead Spruce, giving increased range to deer and elk. Death of the trees was detrimental to Pine squirrel (*Sciurus hudsonicus*), and grosbeaks (*Pinicola enucleator*), but was advantageous to chipmunks (*Eutamias* sp.), woodpeckers (*Dryobates* sp. and *Picoides tridactylus*) and pikas (*Ochotona princeps*). Woodpeckers declined, however, as numbers of barkbeetle larvae became exhausted. Meadow mice (*Microtus* spp.) showed a consistently low population in live forest and an upward trend in dead forest.

2704. Beckwith, L. C. **Collection of European Elm bark beetles in Wisconsin.** *J. econ. Ent.* 46 (5), 1953 (913).

The first official record of *Scolytus multistriatus* in Wisconsin.

2705. Richter, G. Der Wurzelschutz für Kiefer mit Hexa-Präparaten, ein neues Verfahren gegen Engerlingsfrass. [**Scots Pine root protection with BHC preparations, a new treatment against cockchafer damage.**] *Arch. Forstw.* 1 (1/2), 1952 (71–87). 13 refs. [G.]

A preliminary report covering (*a*) the phytotoxicity of 9 substances dusted on the roots of very young seedlings which were then grown on in boxes and (*b*) the efficiency of these substances in preventing cockchafer damage to nursery transplants, and to 1-year and 2-year plants in the field. Dusting of the roots at 300 to 500 g. Silvexan (BHC)/1000 plants had no phytotoxic effect and reduced cockchafer attack to negligible proportions. Digging-in 'Staube-Verindal' (BHC) at the rate of 1·4 kg./100 m. of transplant trench was similarly effective. Dosage at 6·1 kg./100 m. of the latter did not prove phytotoxic.

2706. Nitto, M., and Tachibana, K. [**An ecological study of chafers on the coastal sand dunes. (I) (Relations between populations of larvae [of *Granida albolineata* and *Anomala albopilosa*] and vegetation cover).**] *Bull. Tokyo Univ. For.* No. 45, 1953 (111–9). 9 refs. [Jap.jap.e.]

In studies originating after Pine trees in a windbreak had been damaged, high correlations were found between chafer populations and vegetation, especially *Carex macrocephala*, *Calystegia soldanella*, *Zoysia macrostachya* and *Imperata cylindrica*; larvae were most abundant where there was 51–75% and fewer where there was 100% cover. *From authors' summary.*

Hymenoptera

See also Nos. 2242–4, 2675.

2707. Roberti, D. La lida del pino (*Acantholyda nemoralis* Thomson). [**The Pine sawfly (*A. nemoralis*).**] *Bollettino del Laboratorio di Entomologia Agraria, Portici* 10, 1950–51 (25–85). 35 refs. [It.it.e.] I.I.E.

An account of its life history, distribution, damage, and control with particular reference to an outbreak on *Pinus nigra* in the Abruzzi. [Cf. *For. Abstr.* 12 (No. 1611).]

2708. Capecki, Z. Występowanie borecznika rudego (*Diprion sertifer* Geoffr.) w latach 1948–1952 na terenie południowej Polski oraz uwagi na temat prac prognostycznych. [**Occurrence of *D. sertifer* in 1948–52 in southern Poland, and remarks on prognosis studies.**] *Sylwan* 97 (5), 1953 (321–7). 7 refs. [Pol.]

The outbreak of 1948 had not attained its maximum by 1952, but will probably do so in 1953. In many localities, however, the outbreak did not last more than one year, probably owing to control by

bacteria (*Bacillus septicemiae-lophyri*) and, perhaps, viruses.

2709. Kolubajiv, S. Naše nejškodlivější smrkové pilatky a boj proti nim. [**Our most injurious Spruce sawflies and their control.**] *Lesn. Knihovna* (*malá Řada*) No. 16, 1952. pp. 47. 32 refs. [Cz.] Price *Kčs.*18.

A detailed and illustrated description of *Pachynematus scutellatus*, *P. montanus* and *Lygaeonematus abietum*, followed by enumeration of their natural enemies and methods of biological, mechanical and chemical control.

2710. Gäbler, H. Beiträge zur Kenntnis der kleinen Fichtenblattwespe *Pachynematus scutellatus* Htg. [**Notes on *P. scutellatus*.**] *Arch. Forstw.* 1 (1/2), 1952 (88–99). 9 refs. [G.]

Gives dimensions and descriptions of the egg, larva and adult, those for the larvae including measurements of the head capsule and dung pellet for each of the 4 instars. Its congeners, *P. montanus* and *Lygaeonematus abietum*, found in number with it, are distinguished. A time schedule of its life history is given, and its predators and parasites are detailed. A table shows the distribution of the 1951 epidemic, in 35 forest ranges in Saxony, by area and by age class of stand. The middle age classes suffered most at all intensities of attack. Adults emerging in April 1951 showed the ratio ♀/♂ as 68/31. Application of Silvexan, Duplexan, Duolit extra 20, Arbitan and Wofatox at 30–38 kg./ha. as dusts were effective, but the P content of the last is against its use.

2711. Buckner, C. H. **Small mammals as predators of the Larch sawfly [*Pristiphora erichsonii*].** *Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.* 9 (6), 1953 (2).

The greatest predation occurs during September, when the population of small mammals is at its peak, and predation continues until soil freezing, after which there is little or none until the following September.

2712. Drooz, A. T. **Larch sawfly investigations in Minnesota, 1952.** *J. econ. Ent.* 46 (5), 1953 (826–8). 4 refs.

Results of observations made in 2 study plots in Minnesota on the ecology of *Pristiphora erichsonii*.

Diptera

2713. Trotter, A. Miscellanee cecidologiche. [**Cecidological miscellanies.**] *Nuovo G. bot. ital.* (*n.s.*) 59 (2/4), 1952 (186–96). 25 refs. [It.it.] A.P.B.

Describes the gall insects found on *Fagus orientalis*, discusses mimicry in gall insects, and describes recent research on respiration in gall tissues.

2714. Judd, W. W. **Diptera and Hymenoptera reared from Pine cone Willow galls caused by *Rhabdophaga strobiloides* (Diptera: Itonididae).** *83rd Rep. ent. Soc. Ont. 1952*, 1953 (34–42). 14 refs. I.I.E.

Insects were reared from 250 galls in order to find what flies occur in them and what insects parasitize these flies. Two species of Diptera and 15 species of Hymenoptera were reared. They are listed and described.

46. DAMAGE TO TREE GROWTH BY MAN

2715. Kimmey, J. W. **How to determine when an area was logged.** *J. For.* 52 (1), 1954 (40).

To determine the year in which cutting took place (e.g. for proof of illicit fellings), it is better to have the evidence of several (*a*) 'snoose' cans, (*b*) perennial conks, (*c*) logging calluses and (*d*) residual trees. (*a*) Are the discarded containers of a Copenhagen snuff, much used by lumbermen; the date is stamped on the can, is legible for years and no self-respecting logger buys the snuff over a fortnight old. (*b*) Are bracket fungi, which will readjust the perpendicularity of their pores if the host tree is knocked over. A fresh layer in the new orientation is put on annually. For (*c*) and (*d*) the annual rings will show the year of damage and the year of release respectively.

2716. [**Damage to *Cassia siamea*.**] *Rep. For. Dep. Sudan 1951/52*, 1953 (21).

It was found in Zande Circle that some damage was caused to young *C. siamea* trees by boys climbing them to collect seed. In Acholi, pruning of *Cassia* was abandoned when fungal infection was observed in old pruning scars.

48. INJURIES DUE TO UNKNOWN OR COMPLEX CAUSES

See also Nos. 2276, 2601.

2717. McKay, R., and Clear, T. **Association of *Rhizina inflata* with group dying of Sitka Spruce [at Glendalough].** *Irish For.* 10 (2), 1953 (58–9). 3 refs.

Investigation of a typical case of 'group dying' in a 30-year-old stand of Sitka Spruce showed that roots of all affected trees were completely dead, resin flow was profuse from the base of the stems but there was no stem or butt rot, and the ground round the base of the trees was covered with fructifications of *R. inflata*, a saprophyte that occasionally becomes parasitic.

2718. Wahl, I., and Reichert, I. **The die-back of Aleppo Pines and its relation to mycorrhiza development.** *Palest. J. Bot.* (*R. Ser.*) 8 (2), 1953 (196–204). 10 refs.

In connexion with a study of a disease of *Pinus halepensis* in Israel, characterized by yellowing of the needles and twisting and curling of the shoots, examinations were made of mycorrhizae in both diseased and thriving Pines. In diseased trees the mycorrhizae are darker, thinner and sparsely branched. The Hartig net in the rootlets is thick, intracellular to a considerable extent and reaches the endodermis. The mycorrhizae of normal trees are primarily ectotrophic with a thin Hartig network, restricted to the outer cortex layers. No difference in the thickness of the mycelial mantle in mycorrhizae of normal and abnormal Aleppo Pines could be noticed. It is concluded that this disease of *P. halepensis* is associated with unfavourable ecological conditions reflected in the development and structure of the mycorrhizae. *From authors' summary.*

2719. **Report of the symposium on Birch dieback: summary of the meetings held in Ottawa, Canada, on March 21 and 22, 1952, at the invitation of the Forest Biology Division, Science Service, Department of Agriculture. Parts 1 and 2.** Department of Agriculture, Canada. [1954]. pp. 182. Many refs. Limited distribution.

Includes papers by a number of writers, on various aspects of the subject under the heads: history of Birch dieback; damage (annual and total) caused in the Maritimes; evidence of spread or intensification; ecological, physiological and bioclimatic relations of Birch in different parts of its range; possible effects of climate, soil, insects and diseases on the development of the disease; the variation within injury classes from year to year in sample trees.

2720. Pimentel, A. A. Lopes. Uma ameaça para os montados nacionais. [**A menace to the nation's forests.**] *Estud. Inform. Serv. flor. aqüic. Portugal* No. 11-*C*3, 1953. pp. 9. 10 refs. [Port.port.e.] Limited distribution.

Considers causes of dying out of Cork Oak in Portugal and the possible part played by ecological factors and pathogens, particularly *Phytophthora cinnamomi*, *Endothiella girosa* and *Nummullaria regia*.

5. FOREST MENSURATION. INCREMENT; DEVELOPMENT AND STRUCTURE OF STANDS. SURVEYING AND MAPPING

51. SYSTEMS AND UNITS OF MEASUREMENT

2721. Unités britanniques et américaines utilisées dans les industries du bois et correspondance avec les unités françaises. [**British and American units of measurement used in the wood industries and their correspondence with French units.**] *Bois For. Trop.* No. 32, 1953 (45–50). [F.]

2722. Belyea, H. C. **Log rules with special reference to the Scribner and the Doyle diameter.** *Sth. Lumberm.* 187 (2345), 1953 (276 . . 285).

Traces the historical development of log rules and classifies 115 rules into 5 groups according to their basis on formulae, diagrams, mill studies and standards (of diameter and length dimensions), or as combined log rules.

2723. Minor, C. O. **Miscellaneous converting factors for Southern Pine sawtimber volumes.** *LSU For. Note La. agric. Exp. Sta.* No. 4, 1953. pp. 1.

Gives conversion factors for cu. to bd. ft. for Doyle and International log rules and between these rules, for average trees from 10 to 25 in. d.b.h. The values may be applied to each d.b.h. class or a value representing average stand diameter may be chosen.

52. MEASUREMENTS OF STEM DIMENSIONS AND VOLUME OF TREES, STANDS, FORESTS AND TIMBER

2724. Teszárs, G., and Sárkány, J. Földi fényképmérés az erdögazdaság szolgálatában. [**Ground photogrammetry in forestry.**] *Erdö* 1 (2), 1952 (116–20, 162, 166). [Hung.russ.e.]

A general account of the rôle of ground photography with all its optical refinements, as an adjunct to aerial photography, with special reference to tree measurement and visual checks on silvicultural treatments.

2725. Roberts, C. M., and Young, H. E. **Aids for computing tree volume in Maine.** *Tech. Note Univ. Me. For. Dep.* No. 19, 1953. pp. 5.

Tables showing (1) average form class by diam. classes, (2) double-bark thickness at breast height and 16 ft., (3) merchantable length to a 4-in. top diam. (u.b.), (4) stump diam. (o.b.) and d.b.h., and (5) stump diam. (u.b.) and d.b.h., for *Pinus strobus*, *Tsuga canadensis*, *Picea* spp., *Abies* spp., *Thuja occidentalis*, *Alnus rubra* and *Betula papyrifera*.

2726. Ferreirinha, M. P. Contribuição para o estudo dendrométrico de quatro espécies florestais de Moçambique. [**Dendrometrical study of four forest species of Mozambique.**] *Estud. Inform. Serv. flor. aqüic. Portugal* No. 4–*E*3, 1953. pp. 16 + 15 dgms. [Port.] Limited distribution.

Data were collected from trees of various diameters of 4 species, *Erythrophleum guineense*, *Millettia stuhlmannii*, *Morus lactea* and *Chlorophora excelsa*, felled in the Beira district, as follows: volume of merchantable timber; weight of sawtimber; weight of branchwood (i.e. of diam. < 0·05 m.); and length of clear bole and lower crown length. The results presented are not applicable to stands outside this district.

521. *Diameter (Girth) and Sectional Area*

See also No. 2725.

2727. Houba, A. Křivka tloušťkového rozvrštvení porostů borovice obecné. [**Diameter distribution curve in *P. sylvestris* stands.**] *Lesn. Práce* 32 (11), 1953 (492–6). [Cz.cz.]

Diameter frequency curves have been obtained from available Czechoslovak data for pure stands of *P. sylvestris* 60–70 years old, site class 3 and 4; 80 years, site class 2 and 3; and 90 years, site class 1 and 2. The curves are of the *A* Gram-Charlier type, very similar to the normal Gaussian curve. The poorer the site quality, the more peaked the curve; the higher the age class the more the curve flattens out and broadens its base.

2728. Church, T. W., Jr. **Converting Virginia Pine stump diameters to diameters breast high.** *For. Res. Note Ntheast. For. Exp. Sta.* No. 23, 1953. pp. 2.

Relationships of stump diameter (at 6 in. and 1 ft. from the ground) to d.b.h. have been worked out from 300 sample trees, d.b.h. 1–19 in., ages 10–75 years, and are shown graphically. The value of the derived curves for stands outside the Beltsville Experimental Forest, where the measurements were made, has not been tested.

2729. Smith, N., and Bondeson, V. Bestämning av virkesförråd med tillhjälp av relaskop. [**Determining timber volume using the Relascope.**] *Skogen* 41 (4), 1954 (77–8). 3 refs. [Sw.]

Field trials of the Relascope for estimating b.a. gave satisfactory results, both when measurements were made from 3 fixed points in each plot and from one point selected by the operator as representing average stand density within the plot. When height and b.a. have been determined, volumes are read off from a specially prepared table developed from Jonsson's form-height tables.

522. *Height, Length*

2730. Aird, P. L., and Stone, E. L. **A 45-foot tree-measuring pole.** *J. For.* 52 (3), 1954 (203–4).

Describes (wth diagrams) a telescopic aluminium pole, weighing 12½ lb., and measuring 13½ ft. when collapsed. It can be used by one man.

523. *Bark*

See also Nos. 2382, 2725.

2731. Lewis, N. **A handy bark gauge.** *Aust. For.* 17 (1), 1953 (7–8).

A cheap and handy implement for measuring bark thickness was made from an old triangular file, by graduating the tang in tenths of an in. backwards from the point ($\frac{1}{16}$-in. square) and bending enough of the file proper over in a circle to make a hand-grip.

2732. Grochowski, J. Z badań nad udziałem kory w miąższosci sosny. [**Investigations on the bark volume % in Pine.**] *Sylwan* 97 (6), 1953 (416–30). 7 refs. [Pol.russ.g.]

Numerical data for 537 Pine trees felled in an almost pure and almost even-aged 80-year stand on a 1st-quality site in the experimental forests at Rogow, Poland, have been used to determine approximately : (1) with what accuracy the volume % of bark can be determined in a mature or nearly mature Pine stand by random sampling of different numbers of test trees, the bark volume % of which is measured by a practically accurate method, and (2) how many test trees are needed to obtain a given accuracy of result. It was found that the bark volume % in the trees examined varies from 7·3 to 25·6%, mean 13·9%; the % falls as stem height increases; no correlation between it and d.b.h. has been found, except for the smallest d.b.h. The distribution of bark volume % nearly coincides with the Gaussian distribution, and its coefficient of variation is 18·1%, or nearly the same as for the d.b.h. (18·4%).

524. *Determination of the Volume of Trees and Stands*

524.1. Principles of Volume Determination. Form (Taper)

See also Nos. 2725, 2735–7, 2744.

2733. Fukunaga, K. [**Breast-height form-factor tables for Hinoki [*Chamaecyparis obtusa*].**] *Scientific Reports of the Saikyo University, Kyoto: Agriculture* 2, 1952 (139–47). [Jap.e.] P.R.

Results of a study carried out in the Oe experimental forest (1948–50) in a pure plantation, using Huber's formula. The 254 trees felled were insufficient for reliable data.

2734. Radonjić, M. Analitički izraz donjeg dela kriva stabla. [**Analytical expression for the lower portion of the stem curve.**] *God. Zborn. zemj.-šum. Skopje* 4, 1953 (47–86). 10 refs. [Serb.serb.g.]

Diameter measurements on the butt portion (0–250 cm. from the ground) of 50 Beech stems in S.W. Macedonia show that the following formulae give the most accurate representation of the stem curve:

$$y = \frac{a}{1 - be^{-cx}};\quad y = \frac{a}{3 - e^{-bx}};\quad y = \frac{1}{1 - ae^{-bx}},$$

where a, b, c are constants (varying from one formula to another), e is the base of natural logarithms, x is the height of the cross section and y its radius.

524.3. Volume of Tree Groups and Stands

See also Nos. 2382, 2723, 2729, 2765.

2735. Kajfež, D. Računanje lesne zaloge po Laerovi metodi. [**Evaluation of stand volume by von Laer's method.**] *Gozd. Vestn.* 10 (10), 1952 (299–306). 2 refs. [Sloven.sloven.]

Compares von Laer's method of evaluating stand volume with other methods. This method [see *For. Abstr.* 13 (No. 3204)] does not claim to yield exact volume figures, since it is based on the average form factors taken from the tables, but it has proved, and seems likely to prove for some time to come, very useful in Slovenian forest management, being not much inferior to other methods in accuracy and saving much time.

2736. Whitman, J. A., and Slocum, G. K. **Volume tables for stumps.** *J. For.* 51 (4), 1953 (288).

Outlines briefly procedures for constructing volume tables of stumps with heights exceeding those specified in timber sale contracts. [Cf. *For. Abstr.* 15 (No. 533).]

2737. Altherr, E. Vereinfachung des Hohenadl'schen Massenermittlungsverfahrens durch Verwendung des 'echten' Formquotienten. [**Simplifying the Hohenadl method of stand volume determination by use of the 'true' form quotient.**] *Mitt. württemb. forstl. VersAnst.* 10 (2), 1953. pp. 44. 17 refs. [G.g.]

If Hohenadl's true form factor $\lambda_{0\cdot9}$ must be determined for 20 felled trees for satisfactory stand volume estimation [see *For. Abstr.* 12 (No. 803)], the original method by measuring the mid-diameter of each of the 5 stem sections into which each tree is theoretically divided, means that 100 diameters have to be measured. The neglect of Hohenadl's method in practice is largely due to the laboriousness of this procedure. Krenn and Prodan's discovery of the correlation of $\lambda_{0\cdot9}$ with $\eta_{0\cdot5}$ [*loc. cit.*], however, could offer a short cut; and the aims of the present work were to verify this correlation separately for several important species and to test the regressions deduced upon an adequate body of statistical material. The material consisted of data for 13 plots of Norway Spruce (412 trees) and 9 of Scots

Pine (577 trees), of various site qualities and in various growth regions, with scantier data for Douglas Fir and Japanese and European Larch, all in Württemberg.

When examined in relation to d.b.h. and tree class (separately), $\lambda_{0\cdot9}$ showed no correlation capable of upsetting the use of a single mean $\lambda_{0\cdot9}$ value for a whole stand. The correlation between $\lambda_{0\cdot9}$ and the 'true' diameter-quotient series $\eta_{0\cdot9} - \eta_{0\cdot1}$ was satisfactory for all the species, and showed no systematic variation attributable to differences in site quality. Hence, neglecting site quality, the mean values of $\eta_{0\cdot9} - \eta_{0\cdot1}$ are worked out and tabulated for each species against the values of $\lambda_{0\cdot9}$. Since this correlation is valid, it should be possible conversely to find $\lambda_{0\cdot9}$—and so the whole $\eta_{0\cdot9} - \eta_{0\cdot1}$ series—from a single mean diameter quotient for a given stand. The choice of this quotient falls upon $\eta_{0\cdot5}$ since its values show the least dispersion and are readily smoothed by a straight line. Analysis with $\eta_{0\cdot5}$ as the independent and $\lambda_{0\cdot9}$ as the dependent variable gave the following regressions for $\lambda_{0\cdot9}$ (r = correlation coefficient)—*Spruce*: $0\cdot6987\eta_{0\cdot5} + 0\cdot023$ ($r = 0\cdot8106 \pm 0\cdot0029$). *Douglas Fir*: $0\cdot71479\eta_{0\cdot5} + 0\cdot006632$ ($r = 0\cdot90706 \pm 0\cdot0136$). *Japanese Larch*: $0\cdot77197\eta_{0\cdot5} - 0\cdot033107$ ($r = 0\cdot8947 \pm 0\cdot0156$). *European Larch*: $0\cdot81441\eta_{0\cdot5} - 0\cdot05888$ ($r = 0\cdot92994 \pm 0\cdot0189$). *Pine:* $0\cdot77783\eta_{0\cdot5} - 0\cdot03705$ ($r = 0\cdot83478 \pm 0\cdot0399$). The curves of these relationships lie quite close together, but it is best to keep the species separate because errors in $\lambda_{0\cdot9}$ have a considerable effect in volume estimation and because an identical $\lambda_{0\cdot9}$ value does *not* imply the same $\eta_{0\cdot9} - \eta_{0\cdot1}$ series for different species (e.g. Pine has more taper in the lower, but less in the upper half of the stem than Japanese Larch). Tables are given for each species of the values calculated from the regressions, with a warning that in view of the slender data available the figures for European Larch should not be trusted too far.

After some comparison of the results of this and other methods of stand volume determination, using the same statistical material, the paper concludes with an outline of practical procedure for the simplified Hohenadl method: (1) *Field work*—tree (including stump) height and the two diameters $d_{0\cdot9}$ and $d_{0\cdot5}$ are measured for ca. 20 felled trees (thinnings) estimated to fall in the range between d_- and d_+, having an intact crown and showing no abnormal growth (forking etc.). In enumeration, all trees in the stand will be calipered (1- or 2-cm. d.b.h. gradations); division into separate partial populations may be necessary e.g. for mixtures or 2-storeyed stands. For height, 15–20 standing sample trees must be measured, the measurements being distributed in rough proportion to basal area, over trees in the d_- and d_+ groups (d_- and d_+ values are approximated by counting to 16% of the total number of stems, starting respectively from the lowest and highest d.b.h. values). The value of q^2_H is derived from measurements of d.b.h. and $d_{0\cdot9}$ on these same trees. (2) *Computation*—$\eta_{0\cdot5}$ is obtained as the mean $d_{0\cdot5}/d_{0\cdot9}$ ratio of the felled trees, and the corresponding $\lambda_{0\cdot9}$ is read from the tables. Exact values of d_- and d_+ are calculated by the method of least squares; h and q^2_H are obtained as the means for the standing d_- and d_+ trees, with a graphical correction to bring them into correspondence with the exact d_- and d_+ values. The volume of the two mean trees (d_- and d_+) and of the stand can then be calculated by formula. [Cf. *For. Abstr.* 15 (No. 1646).]

524.6. General Surveys of Forests and Whole Tracts of Forest. Partial Enumeration Surveys, Timber Cruising

See also Nos. 2766–7, 2773.

2738. Ilvessalo, Y. **The third inventory of Finnish forests.** *Finnish Paper and Timber, Helsinki* 4 (8), 1953 (100–1).

A brief account of the methods used. [Cf. *For. Abstr.* 13 (No. 3212).]

2739. Furnival, G. M. **What per cent cruise.** *Sth. Lumberm.* 187 (2345), 1953 (173).

Gives a rule-of-thumb method for determining the % of the area to be sampled, from the acceptable error, by: (1) squaring the acceptable error, (2) multiplying by the total acreage of the area, (3) adding 8000 and (4) dividing 800,000 by the result of (3). The rule can also be modified to calculate the error in completed cruises.

2740. Sanchez Crespo, J. L., and Cobian, J. M. Ensayo de una posible aplicación del muestreo estadístico a cuestiones forestales. [**A possible application of sampling methods to forest problems.**] *Montes, Madrid* 9 (54), 1953 (502–6). 5 refs. [Span.]

Describes and discusses an experiment in the use of (*a*) stratified and (*b*) systematic sampling for a forest inventory in Pine stands in Avila.

525. *Volume by Assortments. Merchantable Volume*

See also Nos. 2627, 2629, 2725.

2741. Sulland, A. Kapping av salgstommer på Østlandet. [**Laying off timber into log lengths in Østland.**] *Tidsskr. Skogbr.* 61 (12), 1953 (453–6). [Nor.]

Gives graphs showing gross and net prices per log for 12–22 cm. top diameters in timber assessed on top diam. or on mid-diam. with taper of 1, 1·5 and 2 cm./m.

2742. Kimmey, J. W., and Hornibrook, E. M. **Cull and breakage factors and other tree measurement tables for Redwood [*Sequoia sempervirens*].** *For. Surv. Release Calif. For. Range Exp. Sta.* No. 13, 1952. pp. 28.

[Cf. *For. Abstr.* 14 (No. 1414).] Cull indicators are shown in photographs and described. Tables include those (*a*) based on 495 old-growth trees, showing % loss of gross volume from different kinds of cull; % loss from cull and from breakage per 10-in. diam. class (21–170 in. d.b.h.) to various top diameters, both by counties; (*b*) based on 55 young trees, showing % loss from different kinds of cull per 10-in. diam. class. Graphs based on all determinable stump counts from the above material show the relationship d.b.h./age both for young growth and for growth up to 1500 years.

2743. Minor, C. O. **Converting basal area to pulpwood volume.** *LSU For. Note La. agric. Exp. Sta.* No. 3, 1953. pp. 1.

Gives factors for converting basal area to rough cords of pulpwood volume for tree heights from 30 to 80 ft. for Southern Pine.

526. *Log Measurement. Scaling*

See also Nos. 2722, 3037.

2744. Gieruszyński, T. O dokładności wzoru Hubera. [**Accuracy of Huber's formula.**] *Sylwan* 97 (4), 1953 (258–68). 10 refs. [Pol.pol.russ.e.]

Huber's formula gives volume errors of up to $\pm 5\%$ (positive errors predominating) for barked tree-length logs of Spruce, and of $\pm 4\%$ (with negative values more frequent) for logs from the lower stem. The effect of rounding off the diameter readings is discussed. The form quotient $d_{0\cdot5}/d_{0\cdot1}$ (mid-diam./diam. at $\frac{1}{10}$ of length from butt end) provides a good check on the accuracy of Huber's simple formula. By using this quotient, volume formulae based on two or three sections can be transformed into single-section formulae giving average values: for tree-length logs $V = 0{\cdot}56.g_{0\cdot1}.l$, and for ordinary logs $V = 1{\cdot}4g_n.l$, or $V = 1{\cdot}1d_n^2l$, where V is volume, $g_{0\cdot1}$ and g_n, are sectional areas at $\frac{1}{10}$th height and top respectively, d_n is top diameter, and l is length of stem or log. The formulae have been developed for 80- to 90-year-old Spruce on a good-quality mountain site.

53. Special Measurements of Trees and Stands (Crown Dimensions, Stand Density etc.)

See also Nos. 2347–8, 2768.

2745. Rothacher, J. S., Blow, F. E., and Potts, S. M. **Estimating the quantity of tree foliage in Oak stands in the Tennessee valley.** *J. For.* 52 (3), 1954 (169–73). 11 refs.

An effective technique was developed for estimating the quantity of foliage in mixed Oak stands in the Tennessee Valley. Leaf measurements collected at three stages of growth in two successive years showed that on the sample acre both leaf area and leaf weight varied significantly, but that number of leaves was constant. Estimating equations for number of leaves by diameter of both tree and branch were developed for several hardwoods and Shortleaf Pine. Those for White, Black, and Scarlet Oaks have been validated in Oak stands in 5 localities. The stand table for a forest area and a similar tally of branch sizes of the tree provide a framework for these estimating equations. They can be used, together with average leaf data, to give foliage area or weight for a forest stand as well as a single tree. In a sample acre of mixed Oak forest, with a basal area of 60 sq. ft., seasonal variation in foliage area (transpiring surface) ranged from 4·3 to 5·2 acres; foliage weight (oven-dry) ranged from 1·3 to 1·7 tons per acre. *Authors' summary.*

2746. Matusz, S. Światłomierz do pomiaru przepuszczalności świetlnej koron drzew leśnych. [**Photometer for measuring the light transmitted through forest tree crowns.**] *Sylwan* 97 (5), 1953 (367–72). 6 refs. [Pol.]

The 'photometer' consists of a convex mirror mounted on a tripod and coated, except in 100 small, evenly distributed patches, with dull-black paint. The mirror is surmounted by a rotatable dome-shaped cover having a peep-hole and opposite to it a sector between 2 meridians, carrying a plate with perforations forming a pattern of $12\frac{1}{2}$ triangles, the area of the sector being $\frac{1}{8}$ that of the dome. The apparatus is first levelled, and then the number of shining points is counted, through the peep-hole, for each of the 8 positions of the sector. The total number of points, divided by the number of holes in the individual triangles (usually 10), give the % of sky not covered by the canopy. The accuracy claimed is $\pm$ 1–2%.

54. Assessment of Site Quality

See also No. 2753.

2747. Cruikshank, J. W. **Site index of the major Pine forest types in the Southeast.** *Res. Note Stheast. For. Exp. Sta.* No. 50, 1954. pp. 1.

Gives tabulated figures of the % distribution of site-index classes (height of dominants and co-dominants at 50 years) by States for the Loblolly, Shortleaf, Virginia, Longleaf and Slash Pine forest types.

2748. Gaiser, R. N., and Merz, R. W. **Growth of planted Red and White Pine in Ohio and Indiana.** *Tech. Pap. Cent. St. For. Exp. Sta.* No. 138, 1953. pp. 14. 17 refs.

In studies in old fields in the unglaciated regions of Ohio and central Indiana, the average height of dominants and co-dominants 25 years after planting was 51 ft. for *P. strobus*, and 38 ft. for *P. resinosa*, with d.b.h. of 8 in. and 6 in. respectively. *P. resinosa* grew more rapidly in height and diameter in mixture with other species; *P. strobus* grew more slowly in height at first but after the 20th year trees in mixed plantations were taller than those in pure plantations. Site quality for both species increased with increasing coarseness of soil texture and decreased with increasing moisture equivalent and permanent wilting % of both A and B horizons. Site index was high where the A horizon was thick, and this factor had the greatest influence on height growth of both species.

56. Increment, Development and Structure of Stands

See also Nos. 2325, 2347–8, 2363, 2382, 2404–5, 2407–8, 2412–5, 2420, 2492, 2502 *et seq.*, 2538, 2748, 2773, 2802.

2749. Erteld, W. Die Entwicklung der forstlichen Zuwachs- und Ertragskunde in Norddeutschland. [**The development of the science of forest increment and yield in North Germany.**] *Arch. Forstw.* 1 (1/2), 1952 (100–10). [G.]

Reviews the growth of this science in the last 50 years into an independent branch of forestry, sketches its modern orientation and states its immediate problems.

2750. Takase, G. **[Studies on increases in mean diameter and decreases in volume in stands after thinning with particular reference to their use in compiling yield tables.]** *J. Jap. For. Soc.* 34 (11), 1952 (344–8). [Jap.e.]

Presents equations based on results of measurements in 90 stands of *Pinus densiflora*. *From author's summary.*

2751. **Relative growth rates of different Luquillo species determined.** *Carib. For.* 14 (1/2), 1953 (8–9, 41–2). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Presents a table showing average annual diam. increment of 20 co- and sub-dominant species of the Luquillo forest, Puerto Rico. The figures are based on samples ranging from 12 to 514 trees from 4 to 20 in. in diam.

2752. **Slow growth in virgin forests confirmed.** *Carib. For.* 14 (1/2), 1953 (7–8, 39–41). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Growth measurements were made in the Tabonuco and Colorado types of forest in Puerto Rico over a period of 5 years and an analysis is presented of 2488 trees belonging to species that grow to a large size. The slow growth of trees in virgin forests is clearly demonstrated by these data. In the Tabonuco type, dominants are growing more slowly than co-dominants.

2753. **Sierra Palm related to diameter and height.** *Carib. For.* 14 (1/2), 1953 (9–10, 42–3). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

An analysis of 5 years' growth of 357 Palms (*Euterpe globosa*) in the Luquillo forest, Puerto Rico, shows that the younger trees are the most rapid growing. The study indicates that the larger the average diameter of the Palms the better the site, both for Palms and possibly for other, more useful, species.

2754. Sowder, J. E. **Lumber grade recovery from young Ponderosa Pine.** *Res. Note Pacif. Nthwest. For. Range Exp. Sta.* No. 88, 1953. pp. 2.

A commercial thinning was made in dense and open portions of a 105-year stand. Conversion studies showed that close-grown trees produced 18% more volume/acre and a higher % of the better grades of timber than the open-grown trees, although those showed an average diameter larger by 5 in., and contained more than twice the bd. ft. volume/tree. The increased value of better grades and higher volume/acre of lumber in close-grown trees may be largely offset by the increased cost of logging and milling the smaller trees. Further studies are needed.

561. *Increment in Height, Diameter, Basal Area, Form and Quality. Variations and Trends; Dendrochronology*

See also Nos. 2680, 2819.

2755. Foote, T. K. **False rings in Larch, *Larix decidua* Mill.** *J. Oxf. Univ. For. Soc.* (*Ser. 4*) No. 2, 1954 (5–8). 5 refs.

The course of growth throughout 2 seasons was studied in 2 trees, 42 and 46 ft. high. Early-wood formation began ca. 1 April and ended in July. During this period drought may cause the formation of a zone of thick-walled cells, visible as a false ring. Such false rings were much more common on shallow and dry soils than on deep, moist ones.

2756. Stridsberg, E. Sammansatt ränta vid tillväxtberäkning i fleråriga perioder. **[Compound interest in the calculation of increment % for periods of several years.]** *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953 (43–52). [Sw.]

A mathematical study of the errors involved in using the mean increment % for a given (e.g. 10-year) period to represent that of some different period (e.g. 5, 20, . . . years).

565. *Sample-plot Technique*

2757. Seth, S. K. **Manual of instructions on experiments, preservation plots, protected trees, statistical sample plots, linear increment plots, and the annual silvicultural report.** Government Printer, Allahabad. 1951. pp. 30.

566. *Yield Tables and Their Construction*

See also No. 2750.

2758. Hummel, F. C., and Christie, J. **Revised yield tables for conifers in Great Britain.** *For. Rec. For. Comm., Lond.* No. 24, 1952. pp. 24.

Yield tables and age/height curves for Scots Pine, Corsican Pine, Norway Spruce, Sitka Spruce, Japanese Larch, European Larch and Douglas Fir: a revision of previously published data [*Bull. For. Comm., Lond.* No. 10].

568. *Other Mensurational Studies of Stand Constitution and Changes Therein. Distribution of Growth by Tree Classes etc.*

2759. McConkey, T. W. **Growth behavior of White Pine in an uncut stand in southwestern Maine.** *For. Res. Note Ntheast. For. Exp. Sta.* No. 25, 1953. pp. 3.

Tabulates figures showing differences in growth rate by species (White Pine, Hemlock and hardwoods) for 3 growth classes in an open mixed stand. Measurements over 15 years show that some trees contribute more than 3 times as much volume as others of the same size and species.

2760. Ker, J. W. **Growth of immature Douglas Fir by tree classes.** *For. Chron.* 29 (4), 1953 (367–73). 4 refs. (Research Paper No. 3, Faculty of Forestry, University of British Columbia.)

Outlines the results of a test of the value of the Tinney-Malmberg [cf. *For. Abstr.* 10 (No. 1051)] and Schädelin systems of tree classification in estimating the growth rates of individual trees in second-growth stands. It is shown that classifications of this kind, which go beyond simple recording of d.b.h. and crown class, give increased accuracy at least in terms of probable growth rate. The auxiliary classifications tested, i.e. 'crown sides free' and 'crown quality' appear to be almost equally effective in reducing errors in estimates of rate of diam. growth. Multiple linear regressions were

calculated to show the effect upon 10-year radial increment of the independent variables,d.b.h., crown class, and crown quality. Such relationships may provide (1) a guide to relative growth-rate of individual trees in drawing up marking rules, and (2) a basis for estimating gross current stand growth. *From author's summary.*

2761. MILETIĆ, Ž. Dalja istraživanja prinosne snage teoriske normalne prebirne sastojine. **[Further investigations on the yield of a theoretically normal selection forest stand.]** *Glasn. šum. Fak., Beograd* 6, 1953 (105–25). 10 refs. [Serb.serb.g.]

In continuation of previous studies formulating several theoretical structures for a normal selection forest before felling, the author develops a formula for one of the variants after felling, viz.

$$N_{xin} = N_x - (N_x - N_{x+1}) \times \frac{l}{T_x}$$

where N_{xin} and N_x are the normal number of trees after, and before, felling in the diameter class concerned; N_{x+1}, the normal number of trees, before felling, of the next higher diameter class; l, the felling cycle in years, and T_x the average *temps de passage* of the diameter class concerned. The author examines the relationship between the normal annual cut and the normal increment, by diameter classes and for the whole stand; also recruitment to the main stand. Results are: (1) The theoretical analysis is confirmed by investigations of a normal forest (at Crnilug); more particularly: the mean of the normal c.a.i. values before and after felling is always less than the normal annual cut; it equals the normal annual cut only after addition of the volume of the annual recruitment. (2) The annual volume increment % falls progressively from the lowest to the highest diam. class; the mean for the whole normal selection forest is calculated at the fairly high value of 3·4%. (3) Graphs comparing the normal annual cut (A_1) and c.a.i. (Z_{m1}) and tabulated values of A_1/Z_{m1} for 5-cm. diam. classes from 5 to 60 cm. in the hypothetical normal selection forest, enable the following inferences to be drawn: Z_{m1} exceeds A_1 in the small and middle diam. classes; in the 50-cm. class the two values are equal, and in the 60-cm. class A_1 is over 10 times Z_{m1}. (4) Satisfactory accuracy is claimed for the author's method of finding the mean tree volume of recruits to the main stand. For this, r', the maximum diameter attainable by recruits in the lowest diam. class during a felling cycle is found as $r' = \frac{l}{T} \times b$ where l is the felling cycle, T the *temps de passage* of the first diam. class and b the class interval. The mean diam. of the recruits occurs at about the middle of the interval between r' and the lower limit of the class. For the hypothetical normal forest this point lies at 14 cm., i.e. lower than the mid-point (15 cm.) of this diam. class. Only when $l = T$ can these two points coincide, and since usually $l < T$, the mean diam. of the recruited trees will usually be lower than the mid-point in this class. Hence the *méthode du contrôle*, generally with $l < T$ for this class, suffers from a systematic error, giving in most cases too high a volume for the recruited trees.

58. SURVEYING AND MAPPING. AERIAL SURVEYS

See also No. 2724.

2762. JOHNSON, E. W. **Ground control for planimetric base maps.** *J. For.* 52 (2), 1954 (89–95). 6 refs.

Gives notes on the procedure for using (1) the general land-office lines and corners, (2) the radial line plot, (3) a road survey's net, (4) an independent triangulation, (5) cadastral boundary survey data, (6) State rectangular co-ordinates, (7) geodetic co-ordinates, to supply ground control on air photos for forest maps under U.S. conditions.

2763. HAGBERG, N. Skovsavfattning på flygbilder. **[Mapping forests from air photographs.]** *Norrlands SkogsvFörb. Tidskr.* 1953 (3), (369–410). 33 refs. [Sw.sw.e.] (*Meddelande från Kommittén för Skoglig fotogrammetri.*)

A study was made on standard photographs used by the Geographical Survey Office, on a scale of about 1 : 20,000, covering a forest area of over 200 sq. km. in different parts of Sweden. Preliminary results are as follows: on the basis of strict tolerances about 67% of the divisions (into forest stand, bog, marsh, etc.) were correctly mapped, and on the basis of practical forestry needs ca. 75% were satisfactorily defined. The results were rather better for N. than for S. Sweden. The various %s of error in assessment of site class, and tree age and species are discussed; they are all comparatively small. The method is expected to be commonly used especially in N. Sweden.

2764. BICKFORD, C. A. **Increasing the efficiency of airphoto forest surveys by better definition of classes.** *Sta. Pap. Ntheast. For. Exp. Sta.* No. 58, 1953. pp. 9. 8 refs.

Concludes as a result of studies on photographs of 8044 plots that classification into cu.-ft. classes (8 classes ranging from 0–100 cu. ft./acre to over 2500 cu. ft./acre) gives more accurate results than classification into 'stand-size' classes (3 sawtimber, 2 pole timber, 2 seedlings and saplings, and unstocked).

2765. FERREE, M. J. **Estimating timber volumes from aerial photographs.** *Tech. Publ. N.Y. St. Coll. For.* No. 75, 1953. pp. 50. 27 refs. Price $1·00.

Contains chapters on: historical background and general outline of procedures; methods of collecting field data; office computations of plot data; application of techniques (plot-cruise method, mean-crown-diameter method, tree-crown-count method) with some hints on photo interpretation; and results of accuracy tests of techniques. There is an appendix giving 33 forest-type and site volume tables for the principal types of the N.E. United States. Stress is laid on four new procedures of the first importance in estimating timber volumes from vertical aerial photographs: (1) stratification of the forest area; (2) correlation of crown size with diameter in the homogeneous strata established by procedure (1); (3) determining adjustments for timber volumes in trees not having crowns visible on photos; and (4) adjusting estimates for timber growth added since the photos were taken—these adjustments

being particularly important if photos are more than 5 years old.

2766. Bickford, C. A., Chapman, R. A., and Caporaso, A. P. **Report on co-operative test of 'continuous-inventory' forest survey system in Eastern Maryland.** Northeastern Forest Experiment Station, Upper Darby, Pa. 1952. pp. 31.

Results of tests using aerial and ground surveys in the 'continuous-inventory' system (based on measurements of change in a series of revisited sample plots) are summarized. Times and costs of measuring are examined.

2767. Bickford, C. A. **Use of aerial photographs in estimating forest drain.** *Sta. Pap. Ntheast. For. Exp. Sta.* No. 59, 1953. pp. 10.

A trial was made in Worcester County on the use of aerial photos, taken in 1938 and 1949, to classify forest areas and estimate changes. The area was divided from the photos into 4 classes—no apparent cut, probably uncut; no apparent cut, possibly cut; lightly cut, less than half of crown canopy removed; heavily cut, more than half of crown canopy removed. This was followed by a field examination of a sample from each class to obtain data on trees felled, volume by species being estimated from stump data by regression equations of d.b.h. over stump height and diam. u.b. From these data, estimated volume of drain of hardwoods and softwoods, pole timber or sawtimber was obtained. Results are tabulated and the value of the method and its cost are discussed.

2768. Young, H. E. **Tree counts on air photos in Maine.** *Bull. Univ. Me. For. Dep.* No. 21, 1953. pp. 2.

In Maine, the natural density of mixed coniferous, pure Pine, and Pine/Hemlock stands is such as to preclude detailed measurements on air photos, and the accuracy of tree counts on photos at the commonly used scale (1 : 15,800) is too low to be of practical use.

2769. Rey, P. L'identification de la végétation par la photographie aérienne. **[Identification of vegetation from air photographs.]** *Trav. Lab. for. Toulouse* 1 (5) Art. 12, 1952. pp. 4 + 2 plates. 10 refs. [F.]

Notes on the identification of different kinds of land use, and characters for identifying on air photographs *Pinus halepensis*, *Fagus sylvatica*, *Castanea sativa*, *Abies alba* and *Picea abies*.

6. FOREST MANAGEMENT. BUSINESS ECONOMICS OF FORESTRY. ADMINISTRATION AND ORGANIZATION OF FOREST ENTERPRISES

61. FOREST MANAGEMENT: GENERAL, THEORY AND PRINCIPLES

See also Nos. 2384, 2761, 2773.

2770. Hiley, W. E. **Woodland management.** Faber and Faber Ltd., London. 1954. pp. 463 + 58 photos. Price £3. 3*s*.

A textbook intended primarily for British owners, agents, and head foresters who have charge of private woodlands, and dealing with administration, finance, working plans, taxation, Government control, the cost of operations, and reasons for adopting one system of silviculture rather than another. It is based mainly, not on previous published work but on the author's own experience of practical problems.

2771. Setten, G. G. K. **Planning and control in the managed forest.** *Malay. Forester* 16 (4), 1953 (237–41). 3 refs.

Review of M. L. Anderson's translation of *H. Knuchel*: 'Planung und Kontrolle im Forstbetrieb'. [Cf. *For. Abstr.* 14 (No. 3638).]

2772. Wiroatmodjo, R. S. Daur (turnus) djati. **[The rotation of Teak.]** *Rimba Indonesia* 2 (5), 1953 (210–8). 6 refs. [Jav.e.]

After a discussion of the merits of long and short rotations the author recommends short rotations, e.g. 40 years, and intensive management for forests of site class III on level ground and economically well situated. *From author's summary.*

62. WORKING PLANS. ANNUAL OR PERIODIC YIELD. YIELD REGULATION

2773. Richter, A. Aufgaben und Methodik gegenwartsnaher Forsteinrichtung. **[Problems and methods in contemporary forest management.]** *Arch. Forstw.* 1 (1/2), 1952 (31–46). 9 refs. [G.]

Discusses the 3 main tasks of practical management for the maintenance and improvement of site productivity by proper adjustment of site, crop and economic aims under 'quasi-natural' forestry—now the urgent concern of most German foresters. New methods are needed and must if possible be introduced within the next 10 years; these are discussed on the basis of research in progress at Eberswalde in connexion with the elaboration of a new working plan for the instructional forest. (1) *Description and stocktaking*: Essential preliminaries are site mapping and the division of compartments into permanent subcompartments ($\lessdot$ 1 ha., optimum 5 ha.) according to site types. Systematic crop sampling is under trial on an area of 215 ha., using a grid—laid afresh for each compartment—providing one [permanent?] circular plot per $\frac{1}{2}$ ha. with an adequate number of plots per subcompartment. Errors of $\pm$ 10–15% at subcompartment level are reduced to 1–2% for the whole forest range. Plot size is varied with tree diameter: after preliminary studies with larger plots, present sizes vary from 0·0025 ha. for trees 7–9·9 cm. to 0·04 ha. for those over 25 cm. in d.b.h. (radii 2·82 to 11·28 m.). Stem and crown quality as well as d.b.h. (5-cm. gradations) are recorded. As no generalized height-curve tables exist for the region, at least 2 heights are measured per diam. gradation and species, in each compartment, to get the height curve. (2) *Planning*: Silvicultural prescriptions are founded on recommended practice for specific site types, on 'production aims' (categories of wood to

be produced) and intentions as regards crop structure, regeneration etc. Yield is the sum of silviculturally admissible fellings, checked by (*a*) fellings in % of actual growing stock, (*b*) ratio of actual to optimum growing stock (the latter still to be determined, so estimated at present from yield tables), and (*c*) past increment. A conspectus is given of the necessary records, which include maps (1 : 5000, 1 : 10,000, 1 : 100,000) and—on punched cards—structure of growing stock, fellings, site types etc., analysed by different combinations of factors, plus prescriptions on silviculture and minor products. (3) *Periodic verification of results*: At subcompartment level, successive enumerations give errors too great for estimation of increment, though enabling useful comparisons of growing stock to be made. For areas $\geqslant$ 1000 ha., and probably for grouped data from areas of the same site type, satisfactory increment determination and prediction should be possible. Two special problems are being studied: (i) A suitable common unit of volume for growing stock and felled outturn. Work is in progress to clarify, on adequate statistical material, the relations between cu.m. felled measure and the *Kluppfestmeter* (approximate cu.m. standing volume, from b.a. $\times$ ht. $\times$ empirical factors reducing the cylinder volume to average corresponding felled measure) of Krutzsch and Loetsch [*Holzvorratsinventur und Leistungsprüfung der naturgemässen Waldwirtschaft*. Neudamm. 1938]. Unlike the silve, this unit would avoid the necessity of calipering all trees to be felled. (ii) Elimination of the complications of Biolley's control method in increment determination. The 'increment potential' of the same authors (an index derived from crown quality, height, diam. and age) is being investigated for this purpose, but the compilation of practical tables is unlikely in the near future, and Weck doubts whether it is practicable at all for mixed, several-storeyed, forest. Hence it may prove necessary to include sampling with the increment borer in enumeration work.

2774. Haselhuhn. Über die Entwicklung der Ertragsregelung in Thüringen. [**The development of yield regulation in Thuringia.**] *Arch. Forstw.* 1 (1/2), 1952 (111–26). 16 refs. [G.]

Reviews the history of the subject from the first recorded regulation of the yield in the town forest of Erfurt (1389).

2775. Klepac, D. Nekoliko formula za intenzitet sječe. [**Some formulae for felling intensity.**] *Šum. List* 77 (9/10), 1953 (373–85 + 4 photos). 8 refs. [Croat.f.]

Develops 2 formulae: (1) for thinnings, giving volume to be removed during a thinning cycle in % of the hypothetical growing stock at the end of the corresponding period in the absence of thinnings; (2) for fellings in selection forest, giving the % volume to be removed during the felling cycle in order that initial and final growing stock shall be equal.

2776. Patrone, G. Piano di assestamento del bosco del Comune di Guardiaregia. [**Working plan for the communal woodland of Guardiaregia.**] *Ital. for. mont.* 8 (3), 1953 (126–60 + 1 map). [It.f.]

The woodlands consist of even-aged Beech and *Quercus ilex*, selection Beech forest, and *Q. ilex* and Beech coppice.

65. SPECIAL BUSINESS PROBLEMS OF TIMBER-GROWING. CALCULATION OF COSTS AND PROFITABILITY. VALUATION

See also Nos. 2504, 2754, 3153.

2777. MacGregor, J. J,. and Mutch, W. E. S. **An introduction to the survey of private forestry costs in England and Wales.** Imperial Forestry Institute, Oxford. 1953. pp. 16. 6 refs. Price 5*s*.

Explains the need for the survey, how it is organized, and its terms of reference. It is to extend over a period of 5 years in the first instance and will cover the whole range of forestry operations on selected estates (excluding nursery costs). The primary aim is to ascertain costs of particular silvicultural operations.

2778. MacGregor, J. J., *et al.* **Survey of private forestry costs: England and Wales. First annual report 1951–2 including supplementary report for 1946–7 to 1951–2.** Imperial Forestry Institute, Oxford. 1953. pp. 32.

The first report of the survey described in the preceding abstract. The abbreviated title in *Forestry Abstracts* will be *Rep. Surv. private For. Costs England Wales*. The total number of co-operating estates in the first year was 57 with total acreage of 52,424 acres. The preliminary data derived for a number of silvicultural operations is given in a series of 18 tables. There is an appendix on the allocation of overheads.

2779. Keltikangas, V. Voidaanko ja miten metsäojituksessa ottaa huomioon kannattavaisuusnäkökohdat? [**How far can the aspect of profits be considered in forest drainage.**] *Metsät. Aikak.* 1953 (12), (406–8, 402). 5 refs. [Fi.e.] (*Metsätietoa, Helsinki* No. 2, 1953.)

Calculations of income and cost factors on the poorest wet peat soil types must be made on a very long-term basis, rendering the calculations very uncertain. Relative drainage values of the different types can be more easily calculated. The value is affected by the amount of recoverable growing stock at the time of drainage, and forested types should be chosen; wet peat types of poor or medium biological quality should not be drained. From the aspect of profits, drainage of large areas is to be preferred, costs/ha. being lower than for small areas. *From author's summary.*

2780. Ugglas, C. af. Närmemetod, vid rotvärdeskalkylering. [**An approximate method for calculating stumpage value.**] *Skogen* 40 (12*), 1953 (141*–143*). [Sw.]

The method calls for the assessment of the 'forest net value' (price minus felling and transport costs) for the different assortments in the felling area, added together to give the total forest net value. As different assortments are calculated on different units of volume, tables are given showing factors for converting price and costs per log calculated on f³to (cu. ft., top measurement), or m³t (cu.m., stacked measure) to m³f (actual volume u.b. in cu.m.) for logs of different diameters (measured at top or

butt) and lengths. Some adjustments are needed if taper is abnormally large or small. Bark conversion factors for Pine and Spruce allow calculation of price with bark. Examples are given of the use of the tables and of their value in determining whether a given log should be marked for pulpwood or timber.

66. COSTING OF LOGGING OPERATIONS

See also Nos. 2516, 2558, 2565–6.

2781. HALLEY. Quelques prix, quelques rendements, obtenus dans une exploitation forestière du Cameroun. **[Some costs and figures of performance in a logging operation in Cameroun.]** *Bois. For. Trop.* No. 32, 1953 (15–23). [F.e.span.]

Detailed costs (wages, supplies, tractors and other vehicles, overheads, amortization and taxes) and outputs for various operations (survey, felling, skidding, cross-cutting, barking and removal of sapwood, preservative treatment, roads, loading, hauling, unloading) for a typical operation.

2782. WALAN, S., and SAMUELSON, K.-R. Undersökning av indirekta lönekostnader vid skogsarbete. **[An investigation of indirect wage costs in forest work.]** *Skogen* 41 (2), 1954 (44–5). [Sw.]

In a study of costs over 4 years for a large forest concern in Uppland, wages of drivers and fellers respectively were found to average 43 and 78% of the total costs. The heaviest indirect costs were repairs, amortization, house rents and rents of land.

68. ADMINISTRATION AND ORGANIZATION OF FOREST ENTERPRISES

686. *Planning and Organization of Buildings, Transport Installations (Roads etc., including Power-line Rights-of-Way)*

2783. SIRÉN, G. Pysyvä palstatieverkko ja metsänhoito. **[A permanent network of haulage roads and silviculture.]** *Tied., Metsäteho, Helsinki* No. 93, 1953. pp. 3. [Fi.e.] Also in *Metsät. Aikak.* 1953 (12), (411–3).

Concludes from a survey of the factors involved that a permanent road system causes very little reduction in the growing stock of the forest, and that the improved efficiency both in logging and silviculture easily compensates for possible loss of volume.

7. MARKETING. ECONOMICS OF TRANSPORT AND THE WOOD INDUSTRIES

See also Nos. 2555, 2904.

2784. **A nomenclature of timber associations and technical publications [of O.E.E.C. member countries].** O.E.E.C., Paris. 1953. pp. 104. Price 5*s*.

Lists for each country (Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey and the U.K.) the research, development and testing institutes, standardization associations, development associations and information centres, trade associations, commercial and other associations, the technical, commercial and statistical publications entirely or mainly devoted to timber, and other scientific or technical journals that frequently publish articles relating to timber, giving for each its objects and address. Five international timber associations are also listed.

71. MARKETING OF FOREST PRODUCTS: GENERAL

2785. El Servicio de la Madera y la ordenación maderera en España. **[The 'Servicio de la Madera' and the organization of the timber industry in Spain.]** *Montes, Madrid* 9 (52–54), 1953 (369–74; 459–64; 521–5). [Span.]

A brief history of the Spanish timber trade, a discussion of its problems, and an account of the work of the 'Servicio'.

2786. TEILLAC, J. Le commerce des bois en Côte d'Ivoire: la production, la concurrence. **[The timber trade in the Ivory Coast: production and competition.]** *Bois For. Trop.* No. 32, 1953 (36–44). [F.e.span.]

2787. **Report of the timber mission to the British West Indies, British Guiana and British Honduras, October–December, 1952.** H.M. Stationery Office, London. *Colonial* No. 295, 1953. pp. 66. Price 2*s*. 6*d*.

The object of the mission was to investigate the possibilities of increasing the output of W. Indian timbers and of marketing them. General recommendations are supplemented by reports for individual countries. Methods of extraction, conversion and transport were studied as well as new uses for timbers and marketing problems.

72. THE QUANTITATIVE ASPECTS OF MARKETING. DEMAND, CONSUMPTION AND SUPPLY

See also Nos. 2909, 3130, 3132–3, 3136–9.

2788. **Yearbook of forest products statistics 1953.** FAO, Rome. 1953. pp. 153. [E.F.Span.]

Contains new information for 1952 and revised data for 1951 for more than 100 countries.

2789. **Prospects of the timber market in 1954. Report of the O.E.E.C. timber committee.** O.E.E.C., Paris. 1954. pp. 13 + 7 tbls.

2790. Skogindustriene i året som gikk. **[The wood industries in the past year.]** *Norsk Skogind.* 8 (1), 1954 (4–10). [Nor.E.] P.R.

The paper and board, chemical and mechanical pulp, timber and wallboard industries in Norway in 1953.

2791. Ulkomaankauppa. Vuosijulkaisu 72, 1952. **[Foreign trade. Annual report 72, 1952.]** Suomen Virallinen Tilasto, Helsinki. 1953. pp. 45 + 234. [Fi.Sw.e.]

2792. **White Pine production and export.** *Timber of Canada* 14 (5), 1954 (22–3).

Gives figures for production and exports of *Pinus strobus* timber in the various provinces in recent years.

73. PRICES

See also Nos. 2741, 3132.

2793. TODD, A. S., JR. **Trends in the price of Southeastern Pine pulpwood.** *Res. Note Stheast. For. Exp. Sta.* No. 46, 1954. pp. 1.

Tabulates figures for prices from 1938 to 1952.

78. ECONOMICS OF TRANSPORT

See Nos. 3040, 3132.

79. ECONOMICS OF THE WOOD INDUSTRIES

See also Nos. 2909, 3040, 3074–5, 3132–3.

2794. SIMON Y DE SIMON, E. DE. Aprovechamientos en los montes de Jaén. **[Products from the forests of Jaén.]** *Montes, Madrid* 9 (54), 1953 (495–501). [Span.]

Describes the forest industries (both timber and other products) of this region, and gives figures for production from 1942–43 to 1951–52.

8. FOREST PRODUCTS AND THEIR UTILIZATION

See also Nos. 2557, 2784.

2795. ***Composite Wood.*** D. Narayanamurti, 15 Beeson Road, New Forest P.O., Dehra Dun, U.P., India. Periodicity not stated. Price *Rs*.12 p.a.; foreign *Rs*.14 p.a.; single copies *Rs*.2 *as*.8. P.R.

Vol. 1, No. 1, published in Oct. 1953, consists of 26 pages and contains 4 papers, notes and news, 18 abstracts, and 2 book reviews. Abbreviation in *For. Abstr.*: *Comp. Wood.*

2796. **[Applied research on wood technology in Japan.]** *Wood Ind., Tokyo* 9 (1), 1954 (4–49). [Jap.] P.R.

This number is devoted to applied research on wood technology in Japan for 1951–52, with short reports from workers in the Ministry of Agriculture and Forestry and 4 other Ministries. Subjects include: design and preparation of fibreboard

chippers and defibrators, veneer edge-gluers, preparation of bleached pulp, and hardened laminates. There is a classified list of current literature, largely Japanese, German, American and English.

81. WOOD AND BARK: STRUCTURE AND PROPERTIES

810. *General Information on Woods*

See also Nos. 2310, 2382, 2409.

2797. **Trees and timbers of Sarawak and Brunei.** *Leafl. For. Dep. Sarawak* Nos. 24–29. [1953.] [Cf. *For. Abstr.* 15 (No. 1715).]

(24) Burseraceae (mainly *Canarium* and *Santiria* spp.) and Celastraceae (*Lophopetalum* spp. and *Kurrimia paniculata*) (pp. 6).

(25) *Canangium odoratum* (including an account of the essential oil), *Mezzettia* spp., *Polyalthia* spp., *Xylopia ferruginea*, *X. fusca* and *Dolichandrone spathacea* (pp. 7).

(26) *Buchanania* spp., *Dracontomelum mangiferum*, *Mangifera* spp. and *Pentaspadon* spp. (pp. 6).

(27) *Combretocarpus rotundatus*, *Carallia* spp., *Gynotroches axillaris*, *Pellacalyx* spp., *Nephelium* spp. and *Pometia* spp. (pp. 7).

(28) *Durio* spp. (also fruit), *Neesia* spp., *Hibiscus tiliaceus*, *Thespesia populnea* (also fibres), *Scorodocarpus borneensis*, *Ochanostachys amentacea* and *Strombosia javanica* (pp. 10).

(29) (Including, for many species, notes on poisonous properties.) *Antiaris toxicaria*, *Artocarpus* spp., *Ficus* spp., *Gironniera nervosa*, *Laportea stimulans*, *Parartocarpus* spp., *Sloetia elongata* and *Trema orientalis* (pp. 15).

2798. SOEDARSONO. Flora pohon-pohonan suku: Moraceae. [**Trees of the family Moraceae.**] *Rimba Indonesia* 2 (8/9), 1953 (305–34). [Jav.]

Describes species of *Antiaris*, *Artocarpus*, *Broussonetia*, *Ficus*, *Morus*, *Prainea*, *Sloetia* and *Streblus* and discusses the properties of their timbers and their economic importance.

2799. SCOTT, M. H. **Utilisation notes on South African timbers.** *Bull. Dep. For. S. Afr.* No. 36, 1953 (5–95). 14 refs.

Describes 51 species under systematic, standard and other names, distribution, sawing, seasoning (linked to one of 7 schedules), macroscopic characters, hand-lens structure (42 photos), working properties and uses. Included are 9 Eucalypts, 10 Pines, and 13 indigenous species of wide African distribution. A strength-data table covers 42 species.

2800. BETTS, H. S. [**American woods.**] *Amer. Woods U.S. For. Serv.* Rev. 1953 (1954).

Silvicultural characters, wood properties and uses of: (*a*) *Chamaecyparis nootkatensis* (pp. 3; 8 refs.); (*b*) *Juniperus virginiana* (pp. 4; 7 refs.); and (*c*) *Ilex opaca* (pp. 4; 11 refs.).

2801. PFEIFFER, J. R. **Basic data for Oregon hardwoods.** *Rep. Ore. For. Prod. Lab.* No. G–2, 1953. pp. 40 + 9 tbls. + 1 map. 159 refs.

Describes briefly the timber characteristics, distribution, properties and uses of 12 species individually, with data on available growing stock, strength properties, grading, sawing, seasoning, working and gluing properties and value as veneer.

2802. BRYAN, L. W.; YAMAYOSHI, H.; WOLD, M. L. **Timber qualities of some exotic timber trees in Hawaii (preliminary report); Timber cruise grand summary; Preliminary report on uses and milling characteristics of exotic timber trees.** [*Bienn.*] *Rep. Bd. Agric. For. Hawaii 1950/51–1951/52*, 1952 (106–13).

Includes tabulated data on acreage, yield and growing stock in Hawaii of *Albizzia moluccana*, *Angophora lanceolata*, *Araucaria excelsa*, *Cryptomeria japonica*, 7 *Eucalyptus* spp., *Fraxinus* sp., *Grevillea robusta*, *Sequoia sempervirens*, *Syncarpia laurifolia*, *Terminalia myriocarpa* and *Tristania conferta*; and on working qualities of these and some other exotic species.

2803. **Specimen woods Nos. 217–8.** *Suppls.* to *Wood* 19 (1; 2), 1954. Each pp. 2.

Turpentine (*Syncarpia laurifolia*), Tawa (*Beilschmiedia tawa*).

2804. GERRY, E., and KRYN, J. M. **Information leaflet. Foreign woods. Espavé, Espavel caracoli, Quina. *Anacardium excelsum* (Bert. & Balb.) Skeels. Family: Anacardiaceae.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1932, 1952. pp. 6 + 2 tbls. 15 refs. P.R.

2805. KRYN, J. M. **Information leaflet. Foreign woods. Courbaril, Guapinol, 'Locust'. *Hymenaea courbaril* L. and *Hymenaea davisii* Sandw. Family: Leguminosae.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1942, 1953. pp. 8 + 2 tbls. 45 refs. P.R.

2806. KEYLWERTH, R. [Holzeigenschaftstafeln:] Cativo. [[**Tables of wood properties:**] ***Prioria copaifera* Gris.**] *Holz Roh- u. Werkstoff* 11 (11), 1953 (455–6). 9 refs. [G.] P.R.

2807. MARSHALL, E. D. **The outlook for the utilization of Mesquite [*Prosopis* spp.].** *J. For. Prod. Res. Soc.* 3 (5), 1953 (69–71, 220, 222).

Gives data on physical and chemical properties of the wood and discusses some potential uses. Satisfactory charcoal has been obtained in trial runs, and an analysis of Mesquite ash shows that it could be used locally as a fertilizer, though its use would probably be uneconomic on a commercial scale. Experiments on its use for hydrolysis were not very successful. A hardboard of fair quality resulted from grinding the whole tree (leaves, bark, wood etc.) and binding with a cheap binder. Pulp yields and quality from sulphate pulping were low compared with those of Southern Pine. Laminated flooring from Mesquite has worn well over 7 years, but trees of sufficient size to produce sawlogs are rare.

2808. Dan Huong. [***Pterocarpus* spp.**] *Bois For. Trop.* No. 32, 1953 (27–30). [F.]

Botanical description and wood properties of *Pterocarpus pedatus*, *P. cambodianus* and *P. macrocarpus*.

2809. PEJOSKI, B. Pridones kon tehnološkoto poznavanje na diva i pitoma foja (*Juniperus excelsa*

Bieb. i *Juniperus foetidissima* Willd.). **[Contribution to technological research on *J. excelsa* and *J. foetidissima*.]** *God. Zborn. zemj.-šum. Skopje* 4, 1953 (3–22 + 8 photos, 1 map). 23 refs. [Maced. maced.f.]

Presents results of a comparative study, including the dimensions of the resin ducts, occurrence of crystals (in the heartwood of *J. foetidissima*), odour, sp. gr., shrinkage, and essential oils.

2810. **Properties of thinnings of home-grown Sitka Spruce (*Picea sitchensis*). Progress Report 2—Consignment No. 763.** Forest Products Research Laboratory, Princes Risborough. 1953. pp. 15.

The material, 49 years old, was from Gravetye Forest, Sussex. It was fast grown for the first 25 years, and averaged 10 or more rings/in. in the outer half. Average sp. gr. was well above that of material from Inverliever [see *For. Abstr.* 15 (No. 1726)] being 0·395 as against 0·311. The soft early wood tore when sawn or worked with a cutting tool but was more satisfactory than that from Inverliever. There was a large % of grade II material and 1·4% of grade I. There was no appreciable collapse in seasoning, but collapse occurred during preservative treatment under pressure. The parcel was superior to that from Inverliever except for larger knots. If graded, 61·7% of the timber should be useful for carcassing and boarding in building work and would be equivalent to the lower grades of Baltic white deals and whitewood from Jugoslavia. The grade-III timber works well, takes nails without undue splitting and should be suitable for rough work in construction, and for boxes and packing cases.

811. *Structure, Identification*

See also Nos. 2799, 2809, 2867.

2811. Kryn, J. M. **Annotated list of references on the preparation of wood for microscopic study.** *Rep. U.S. For. Prod. Lab., Madison* No. 1939, 1953. pp. 8. P.R.

2812. Holdheide, W., and Huber, B. **Similarities and differences in the micro-structure of wood and bark.** *Transl. Commonw. sci. industr. Res. Organ. Aust.* No. 2015, 1953. pp. 12 + 12 photos. 13 refs. Transl. by Mrs. Capell from *Holz Roh- u. Werkstoff* 10 (7), 1952 (263–8). [See *For. Abstr.* 14 (No. 622).] Limited distribution.

2813. Johnston, D. R. **Structure drawings to 'Specimen Woods' Sheets 31-2.** *Wood* 19 (1; 2), 1954. Each pp. 1.

(31) Sapodilla (*Achras sapota*), Dahoma (*Piptadenia africana*), East African Mulberry (*Morus lactea*), and Podo (*Podocarpus gracilior*); (32) Afara (*Terminalia superba*), Sal (*Shorea robusta*), Balsa (*Ochroma lagopus*), and Cilician Fir (*Abies cilicica*).

2814. Inokuma, T., Shimaji, K., and Sudo, S. **[The wood anatomical characteristics of Styracaceae in Japan.]** *Bull. Tokyo Univ. For.* No. 45, 1953 (181–201 + 1 tbl. + 16 photos). 15 refs. [Jap.jap.e.]

Four *Styrax* spp. and two *Pterostyrax* spp. were compared with 5 foreign species from 4 genera. All the Japanese *Styrax* spp. form a single group, distinct from the two Formosan species examined. The *Pterostyrax* spp. were also similar and closely related to each other.

811.1. Anatomical Elements and Tissues

See also Nos. 2295, 2830.

2815. Wardrop, A. B., and Dadswell, H. E. **The development of the conifer tracheid.** *Holzforschung, Berlin* 7 (2/3), 1953 (33–9). 28 refs. [E.e.g.] P.R.

Reference is made to the structure of the cell wall of the conifer tracheid, which consists of a primary wall enclosing a 3-layer secondary wall. In the outer and inner layers of the secondary wall the angle of micellar orientation with respect to the longitudinal cell axis is large, whereas in the middle layer it is small. The development of this structure has been considered and the nature of cell division in the cambium and the dimensional changes involved in tracheid differentiation described. Increase in length of differentiating tracheids is effected at the tips where only the primary wall is present. Secondary - wall formation commences before the dimensional changes of differentiation are complete. This is consistent with the observed increase in the number of turns of the micellar helix per cell with increasing cell length. It has been suggested from other evidence that the helical orientation of the micellar strands in the secondary wall is governed by the cytoplasmic surface. The influence of the radial growth rate of the stem upon tracheid length and cell wall organization is discussed and the correlation between these features and certain properties of the wood and of pulp derived from the wood are briefly referred to. *Authors' summary.*

2816. Harada, H., and Miyazaki, Y. **[Electron-microscope observations of the cell wall of conifer tracheids.]** *J. Jap. For. Soc.* 34 (11), 1952 (350–2 + 11 photos). 8 refs. [Jap.e.]

The fine structure of the pit membrane and the arrangement of fibrils in the secondary wall in tracheids of various Japanese conifers is described and illustrated by photomicrographs with English legends.

2817. Frey-Wyssling, A., and Bosshard, H. H. Über den Feinbau der Schliesshaüte in Hoftüpfeln. **[Fine structure of closing membranes in bordered pits.]** *Holz Roh- u. Werkstoff* 11 (11), 1953 (417–20). 9 refs. [G.g.] P.R.

It has been found that the electron-microscope replica technique cannot resolve the finest details of the structure of closing membranes. The apparent pores are closed by the primary wall. The torus texture reveals parallel cellulose microfibrils running circularly.

2818. Kobayashi, Y. **[A simple method of demonstrating the fibrillar orientation in lignified walls.]** *J. Jap. For. Soc.* 34 (12), 1952 (392–3). [Jap.e.]

Schulze's re-agent was used instead of Cl gas in Bailey's method.

811.4. Growth Rings. Early and Late Wood

See also Nos. 2755, 2824, 2845.

2819. GERMANN, P. J. **Circuit and longitudinal uniformity of growth layers in Ponderosa Pine.** *Abstr. of thesis*, in *Dissert. Abstr.* 13 (6), 1953 (963–4). [University of Minnesota.] O.R.S.

Cross-sections were taken from a tree 55 ft. tall and 280 years old at 14 places in the trunk and 11 places in 2 branches. Measurements were made along 3 radii to points separated by 120°. The following results were obtained: (1) *Horizontal variations in growth*: (*a*) There were considerable variations in width of any given growth ring at different points in the same section. (*b*) The sequence of relative growth-ring thickness was different along the different radii. (*c*) As the S. radius was characteristically narrow, rather fewer incomplete growth rings occurred along it, but otherwise there was no uniformity in the presence of such rings along the different radii. (*d*) The presence of incomplete growth rings in the branches was not related to the greater thickness of growth layers on the underside. (*e*) The trunk was more uniform in all respects than the branches and the lower than the upper branch. (*f*) There was considerable divergence in the different parts of the tree from the growth trend of the tree as a whole, and divergence from the average growth trend was not consistently greater in any one part. (2) *Vertical variations in growth*: (*a*) The radius with growth layers consistently thicker than those in other radii changed from the N. radius for the bottom 10 sections of the trunk to the S.E. radius in the top 4 sections. (*b*) In the branches, the downward radius consistently contained the thickest growth layers. (*c*) The absolute thickness of a given growth layer varied at different levels in the tree even at points on the same radius. (*d*) Incomplete growth rings were not in general distributed uniformly up the tree heights, but their number tended to increase with distance from the base of the trunk or branch.

About 10% of all growth rings were considered typically discontinuous and perhaps 10% more showed 'breaks' in one or more of the sections studied.

811.6. Texture. Grain. Figure

See Nos. 2311, 2822, 2913, 3033.

811.7. *Phloem. Bark*

See also No. 2812.

2820. CHATTAWAY, M. M. **The bark of *Eucalyptus robertsoni* × *E. rossii*.** *For. Prod. News Lett. C.S.I.R.O. Aust.* No. 195, 1953 (6–7).

The bark of logs from 10 hybrid trees was examined and the inheritance of bark features from the parents was assessed. Results are compared with a similar assessment on the general appearance of the trees and the seedling characters of their progeny. [Cf. *For. Abstr.* 15 (No. 634).]

2821. HARADA, M. **[An investigation on the bark of *Ligustrum japonicum* Thunb.]** *J. Jap. For. Soc.* 36 (1), 1954 (3–7). [Jap.jap.e.]

Describes the bark structure.

812. *Physical and Mechanical Properties*

See also Nos. 2347, 3038.

2822. **Physical properties of wood.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1903–19, 1953. pp. 19 + 1 dgm. + 1 gph. + 10 tbls. 36 refs. P.R.

Deals with the following subjects: decorative features of common woods; identification of woods by their general appearance; grain and texture of wood; flat-sawn and quarter-sawn lumber; changes of appearance due to weathering; decay resistance of heartwood of different U.S. species under conditions favouring decay; physical properties (thermal conductivity and thermal expansion, electrical resistance and dielectric properties); effect of chemicals; weight of sawn and round timbers, and working qualities of wood. Tables are appended showing: colour and figure of the common kinds of wood (ca. 60 species); thermal conductivity (oven-dry and at different m.c.); average electrical resistance; loss in strength after soaking in acids; weights (cu. ft. and 1000 bd. ft.); sapwood % of round timbers; weight (lb./cu. ft.) in relation to sp. gr. and m.c.; ease of working with hand tools, and some machining and related properties of hardwood. A graph shows the relationship between compound thermal conductivity and m.c. for different sp. gr. values.

2823. DOHR, A. W. **Southern Hard Elm [*Ulmus alata* and *U. crassifolia*] strength properties compare favourably with Rock Elm [*U. thomasi*].** *Sth. Lumberm.* 187 (2345), 1953 (187–8).

Results of measurements on physical and mechanical properties are shown in graphs.

2824. TODOROVSKI, S. Pridones kon proučuvanje na fizičkite svojstva na prnarot (*Quercus coccifera* L.) **[Physical properties of *Q. coccifera*.]** *God. Zborn. zemj.-šum. Skopje* 4, 1953 (87–139). 22 refs. [Maced.maced.g.f.]

Tests were made on ca. 250 samples taken from two 32- to 35-year-old stems (of dominant trees, ca. 12 cm. d.b.h. and 5 m. height). The heartwood forms 77–85% of the stem volume; it is sometimes hardly distinguishable from sapwood. The growth-ring width varies from 1·34 to 3·87 mm. (mean 2·17 mm.) and the porosity from 39·7 to 46·4% (mean 42·2%). The oven-dry density is 0·837–0·941 (mean 0·898) g./c.c.; nominal density increases with growth-ring width. The total radial shrinkage is 2·55–7·74 (mean 5·16) %; tangential shrinkage 9·55–12·11 (mean 10·73)%; longitudinal 0·01–1·96 (mean 0·57)%; volume shrinkage 13·53–18·99 (mean 15·70)%. The bark contains 8·93% tannins, 3·84% non-tannins, the roots and foliage less tannin and more non-tannin.

812.1. Optical, Acoustic, Frictional, Thermal and Electrical Properties

See also Nos. 2836–8, 2866, 3081.

2825. MACLEAN, J. D. **Effect of temperature on the dimensions of green wood.** *Proc. Amer. Wood Pres. Ass.* 48, 1952 (136–57). 6 refs. P.R.

Experiments on sawn specimens, disks or logs of a number of coniferous and broadleaved species have shown that, when heated in water or steam, green

wood expands in the tangential and shrinks in the radial direction. This accounts for the formation of bursts or star checks from the pith, when round or sawn timber containing boxed heart is heated in steam or hot liquids. Various factors affecting the results are discussed. It follows from the data that, once the dimensions of green wood have been altered by such heating, they alter no further as long as the wood remains unseasoned. *From author's summary.*

2826. **Fire tests on building materials and structures.** *Brit. Stand.* No. 476, 1953. pp. 24. Price 4*s*.

812.2. Behaviour with Liquids and Gases. Moisture Relations etc.

See also Nos. 2847, 2866, 3012–3, 3017.

2827. TOMBACH, H. **The electric moisture meter for wood: how to choose it and what to expect of it.** *Sth. Lumberm.* 188 (2347), 1954 (63 . . .72).

2828. MALMQUIST, L. **Hygroscopic hysteresis of wood at above 100° C.** *Transl. For. Prod. Lab., Can.* No. 67, 1953. pp. 3. Transl. from *Holz Roh- u. Werkstoff* 11 (5), 1953 (174–5). [See *For. Abstr.* 15 (No. 652).] Limited distribution. P.R.

2829. KELSEY, K. E., and KINGSTON, R. S. T. **An investigation of standard methods for determining the shrinkage of wood.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (49–53, 74). 7 refs. [Division of Forest Products, Commonwealth Scientific and Industrial Research Organization, Australia.]

British and American standard tests of shrinkage use 3 or 4 specimens of different dimensions. This study has found no difference between linear shrinkages determined on a 4-in. and a 1-in. dimension. A single specimen 1 in. radially and tangentially and 4 in. longitudinally can therefore be used. Volumetric shrinkage can be calculated from linear shrinkage and no direct determination is needed. In these, as in other tests, the observed values were consistently greater than those calculated. The difference is due to thermal expansion, the oven-dry specimens being hot when linear measurements are made. Amendment of the standard test to specify cooling of the oven-dry specimens before measuring is recommended.

2830. LINDSAY, F. W., and CHALK, L. **The influence of rays on the shrinkage of wood.** *Forestry* 27 (1), 1954 (16–24 + 1 plate). 8 refs.

Dissections from solid blocks and from microtome sections have shown that the broad rays of *Quercus ilex*, *Cardwellia sublimis* and *Helicia terminalis* shrink less radially and more longitudinally (axially) than the intervening tissues. Dried cross-sections show the broad rays projecting from the top and bottom edges, with the other tissues curving inwards. Strips cut with one side composed of a ray and the other of the intervening tissues curve on drying, the strip becoming convex on the side of the ray. The shrinkage rates of sections vary considerably from those of solid wood, but the comparison of one tissue with another gave similar results whichever method was adopted. *Authors' summary.*

2831. **Increasing the utility of wood.** *Carib. For.* 14 (1/2), 1953 (30–3, 60–4). [E.Span.] (*13th Rep. U.S. trop. For. Exp. Sta. 1952.*)

Presents a table showing sp. gr. and volumetric shrinkage of 11 Puerto Rican species, and reports the successful treatment of *Eucalyptus* fence posts with copperized chromated $ZnCl_2$ and of *Casuarina equisetifolia* posts with carbolineum. [Cf. *For. Abstr.* 14 (No. 758).]

2832. HARTMANN-DICK, U. Untersuchungen über die Durchlässigkeit des Holzes bei Druckfiltration. I. Durchlässigkeit für Wasser. [**The permeability of wood to fluids under pressure. I. Permeability to water.**] *Forstwiss. Cbl.* 73 (1/2), 1954 (40–63). 23 refs. [G.g.]

The permeability to water at a pressure of 2 atm. of both sapwood and heartwood of Pine, Spruce and *Acer pseudoplatanus* was tested in both the tangential and radial directions by means of a Thiessen apparatus. Permeability of sapwood varied widely from tree to tree, and in different parts of the same tree. No consistent differences could be demonstrated between the permeability of Pine and Spruce sapwood, nor between specimens tested in the radial and tangential directions. As the time of exposure to pressure increased, the permeability decreased, probably owing to closure of the bordered pits. At the dividing line between sap- and heartwood, permeability values dropped suddenly, and in the heartwood were frequently nil. Pretreatment with alcohol or acetone improved heartwood permeability. In *A. pseudoplatanus*, which forms no heartwood, no regular differences in permeability could be demonstrated, but values were on the whole lower than in the conifers. In these the ratio of early to late wood greatly affected permeability; with a high proportion of late wood in the sapwood, permeability was much increased.

812.3. Density. Specific Gravity. Buoyancy

See also Nos. 2831, 2836.

2833. SPURR, S. H., and HSIUNG, W.-Y. **Growth rates and specific gravity in conifers.** *J. For.* 52 (3), 1954 (191–200). 84 refs.

The literature is reviewed in some detail. Studies by the authors of three stands of *Pinus banksiana*, 38, 57, and 70 years old, showed that (1) height of wood above ground and (2) age of wood at a given height had a highly significant effect on sp. gr. On the other hand, no variation in sp. gr. was attributable to (3) ring width at a given position, (4) stem diameter within a given stand age class, (5) crown class, or (6) topographic site class. In general it would appear that most of the variation in sp. gr. in wood samples is due to position in tree, age at which wood is produced, and structural design of the stem. Growth rate, whether due to position of the tree in the stand or to site, may have an effect on sp. gr. in certain conditions, but its effect is normally much less than those of the above factors. In general it is concluded that conifers should be grown at the fastest rate commensurable with good form, small knot size, natural pruning etc.

2834. HIRAI, S. [**Studies on the wood density of forest trees. (IV). *Cryptomeria japonica* of the**

Tokyo University Forest in Chiba.] *Bull. Tokyo Univ. For.* No. 45, 1953 (203–21). 10 refs. [Jap.jap.e.]

The distribution of density was determined for seven 52-year-old sample trees. Despite considerable differences in individuals, some general tendencies were observed. Average bulk density was 338 kg./cu.m. Inferior trees tended to have heavier wood. Yields/ha. were larger than for the stand previously studied. [Cf. *For. Abstr.* 13 (No. 1509).] *From author's summary.*

2835. Goławski, S. Ciężar właściwy i wytrzymałość na zginanie statyczne drewna bukowego w trzech głównych warstwach przekroju poprzecznego strzały drzewa. [**Specific gravity and static bending strength of Beech in the three main zones of the stem cross-section.**] *Sylwan* 97 (5), 1953 (372–9). [Pol.pol.]

Tests have shown that the highest values of both are found in the peripheral layer and in the layer equidistant from periphery and pith, the differences between these two layers being negligible. Wood from the layer adjoining the pith had the lowest values.

812.7. Strength Properties

See also Nos. 2835, 2881, 2899, 2917, 2922–4, 2927–9, 2933, 2989.

2836. **Some influences of ultrasonic vibrations on wood. Part II. Non-destructive testing of wood.** *Report ,Timber Engineering Co., Washington (Naval Research Contract N9 onr-87000)* No. 1, [1949], (35–42). 2 refs. P.R.

It was found that the frequency for transverse vibration varies directly as $\sqrt{\text{Young's modulus}}$ and inversely as $\sqrt{\text{wood density}}$. Thus, the relationship of the resonant frequency to $\sqrt{\text{modulus/density}}$ can be considered as linear. *Authors' summary.*

2837. Galginaitis, S. V., and Bell, E. R. **Non-destructive testing of wood laminates. Report for July 1, 1953 to August 31, 1953 to Office of Naval Research.** University of Louisville Institute of Industrial Research, Louisville, Ky. [1953?]. pp. (1) + 7. P.R.

The relative transmission of a set of laminated boards for ultrasonic waves of frequency 300 Kc/sec. has been determined. Complete delaminations were readily detected, with a resolution of ca. ½ sq. in. Where only a weak glue joint existed, with no delamination, the defect was registered only ca. 60% of the time. Decay curves for various solid and laminated samples have been obtained, and the logarithmic decrements determined. These results were then compared with the results of destructive tests. While a few extreme cases checked, no general correspondence has been found between the results of the two types of test. *From authors' summary.*

2838. Galginaitis, S. V., Bell, E. R., Fine, A. M., Auer, G., and Roy, J. **Non-destructive testing of wood laminates. Final report to Office of Naval Research.** University of Louisville Institute of Industrial Research, Louisville, Ky. [1953?]. pp. (2) + 24. P.R.

Three general non-destructive methods for the inspection of wood laminates were investigated. They were: (1) an ultrasonic method, (2) a vibration method, and (3) a brittle coating method. The ultrasonic method was tested by measuring the transmission of wood laminates. Complete delaminations could be detected readily. Regions of weak glue joints, however, could not be detected with enough certainty to make the method a practical one. The types of difficulties encountered indicated that any method employing ultrasonics would probably be unsuitable. In the vibration method, prismatic columns were vibrated at their natural frequency, and the logarithmic decrement determined. For solid samples in longitudinal vibration, a function involving the decrement was found to be a measure of the crushing strength of the piece. Laminated samples with the glue lines running the length of the beam were vibrated both longitudinally and transversely. In the case of longitudinal vibrations, the decrement was consistently higher for defective laminates. In transverse vibration, both frequency and decrement proved to be good detectors of defective pieces. There seems to be a good possibility of exploiting this method commercially. In using brittle coatings, it was found that the variations in crack patterns introduced by the properties of the wood overshadowed the effects of flaws. *Authors' summary.*

2839. Grossman, P. **Stress relaxation in wood.** *Nature, Lond.* 173 (4392), 1954 (42–3). [Division of Forest Products, C.S.I.R.O., Melbourne.]

Experiments have been made in an endeavour to relate the creep in beams of *Araucaria cunninghamii*, bent under constant load, to the stress relaxation at constant deformation over a period of 10^5 minutes (2 months). The data were plotted on a logarithmic time-scale as used by Kitazawa [cf. *For. Abstr.* 10 (No. 280)] but the curves did not tally with his equation $F = F_1(1-m \log t)$ where F is the applied force at time t, F_1 is the force after unit time, and m is a constant. It is concluded that the force can be represented much better by the sum of exponential terms with various relaxation times.

2840. Minami, Y. [**Creep and recovery from strain in wood.**] *Wood Ind., Tokyo* 8 (2), 1953 (51, 67–72). 3 refs. [Jap.e.] P.R.

Compressive creep characteristics of *Chamaecyparis obtusa* and *Cryptomeria japonica* were investigated. The relation between creep and time can be expressed by: $\Delta\epsilon = \epsilon - \epsilon_\sigma = \alpha\sigma^\beta t^{l\sigma m}$ where $\Delta\epsilon$ is the amount of creep, σ the stress (kg./sq. cm.), t time, and α, β, l and m are constants. Strain can also be calculated from this formula, which can also be used for the relation between recovery and time. Creep limits obtained by two methods, based on total amount or rate of creep, were compared and it is concluded that total strain must be examined as well as total creep or rate of creep. [Results are given in graphs and tables.] *From author's summary.*

2841. Ericksen, W. S. **The distribution of stress in a wood pole bent by a radial end load.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1933, 1953. pp. 22 + 8 dgms., 6 gphs., 1 tbl. 7 refs. P.R.

2842. Luxford, R. F., and Wood, L. W. **Survey of strength and related properties of Yellow-Poplar [*Liriodendron tulipifera*.]** *Rep. U.S. For.*

Prod. Lab., Madison No. 1516 (rev.) 1953. pp. 15 + 1 photo + 4 dgms. + 18 gphs. + 4 tbls. + 1 map. 4 refs. P.R.

Cf. *For. Abstr.* 7 (No. 251).

2843. Göhre, K. Die Schlagbiegefestigkeit des Robinienholzes. **[The impact bending strength of Robinia timber.]** *Arch. Forstw.* 1 (1/2), 1952 (7–22). 9 refs. [G.g.]

Tests at Eberswalde on *R. pseudoacacia* from a variety of sites gave the following results. Impact bending strength (*a*) ranged from 0·81 to 1·57 (mean 1·19) m.kg./sq. cm. It was not significantly correlated with position (height) of sample in the stem nor with breadth of annual rings but was considerably reduced by slope of grain (> 7°) and by knottiness. Correlations with latewood %, density, modulus of elasticity and compressive strength were very loose; but with tensile strength much better. Monnin's ratio $I_d = \frac{a}{r^2}$, where r = density, averaged 2·22, which ranks this timber as extremely shock-resistant. Its toughness was also evidenced in the type of failure (long splintery fracture) and the sound of the break. Conclusions are that Robinia is very suitable for highly stressed members requiring at the same time exceptional shock resistance. At present the supply, in lengths greater than 0·50 m., of material that meets the requirements in grain angle and clearness, is limited, but the aim should be to raise straight-grown timber. The high I_d value indicates the utility of this species for light construction.

2844. Janiczek, M., and Butra, B. Badania wytrzymałości kopalniaków z grochodrzewu (*Robinia pseudoacacia* L.). **[Strength tests of Robinia pitprops.]** *Prace Inst. Bad. Leśn.* No. 95, 1953 (3–39). 10 refs. [Pol.pol.russ.e.]

Tests with Robinia pitprops 2, 3 and 4 m. long, made from sound wood with an average ring width of 2·5 mm., taper up to 3·0 cm./m., slenderness (the quadruple length/diameter ratio) up to 123, maximum curvature up to 2·5 cm./m., and moisture content 18·25%, have shown that the bending resistance of these props exceeds that of Pine pitprops tested at the Cracow Mining and Metallurgical University (results not yet published); the scatter of values, however, is greater for Robinia than for Pine. Supplementary results seem to show that, for higher moisture content, corresponding to conditions in mines, Robinia props will prove much more suitable than Pine. Those with a relatively high moisture content are recommended.

2845. Ivanov, Ju. M., and Panferov, K. V. Deformacii ranneĭ i pozdneĭ drevesiny sosny pri sžatii poperek volokon davleniem do 3500 kg./cm.² **[Deformation of the early and late wood of Pine when compressed at right angles to the grain under pressures up to 3500 kg./sq. cm.]** *Trudy Instituta Lesa, Moskva* 4, 1949 (261–71). 3 refs. [Russ.russ.]

Presents results of tests made on samples of the same wood as that used by Panferov [cf. *For. Abstr.* 14 (No. 3723)], with a moisture content of 10–18%, at 15–16° C. The difference in mechanical properties between early (e.w.) and late (l.w.) wood is reflected in the deformations of the wood as a whole during radial compression: the higher value of the limit of plastic flow in the l.w. and the course of the stress/strain curve beyond the point at which cavities have been crushed out, cause similar behaviour in the wood as a whole; this fact is explained by the existence of separate compression phases for e.w. and l.w. For tangential compression the difference between e.w. and l.w. is not markedly reflected in the stress/strain curve of the wood as a whole, which resembles that for e.w. The stress/strain curves for the wood as a whole during both radial and tangential compression show a horizontal portion corresponding to the crushing phases of e.w. and l.w. cells. Measurements of radial-compression deformations for e.w. and l.w. separately up to 3500 kg./sq. cm. have revealed that the deformation curve passes smoothly into a steep straight portion corresponding to the work done on wood in the crushed state.

2846. Imaizumi, S. **[Effect of the slope of the annual rings on testing tension perpendicular to the grain.]** *J. Jap. For. Soc.* 35 (11), 1953 (355–8). 6 refs. [Jap.e.]

Tests were made on samples of *Tsuga sieboldii* and *Chamaecyparis obtusa* with loads applied radially and tangentially, and with the direction of the rings at 45° to the direction of loading. Tensile strengths when the load was applied tangentially were higher than those with the load applied at 45°. With the latter, elongation was about 4 times that with tangential and 8 times that with radial application. These results are related to the structure of the wood. [Results are given in tables and graphs with English text.] *From author's summary.*

2847. Ellwood, E. L. **Properties of Beech in tension perpendicular to the grain and their relation to drying.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (202–9). 12 refs.

Tests on *F. grandifolia* ranging from 6% moisture content (m.c.) to green, and at temperatures ranging from 80 to 160° F., showed that: (1) maximum stress, modulus of elasticity and fibre stress at proportional limit decrease with increased m.c. and temperature, modulus of elasticity being most affected; (2) maximum stress showed a linear relationship with both m.c. and temperature, the max. temperature effect occurring at 18% m.c. and the effect of m.c. increasing at the higher temperatures; regression equations are given for max. stress on temperature for various m.c.'s; (3) the relationship of both modulus of elasticity and fibre stress at proportional limit to temperature was predominantly linear and that to m.c. curvilinear; the effect of temperature appeared least for the green material, but no marked temperature effect on the m.c. relation was apparent; regression equations are given; (4) max. strain at 6% m.c. was markedly lower than at the other m.c.'s; its increase (never large) with temperature was predominantly linear at all m.c.'s. An interpretation of drying behaviour in the test is given and results of limited tests on the effect of duration of load are discussed. *From author's summary.*

813. *Wood Chemistry*

See also Nos. 2249, 3038 *et seq.*

813.1. Chief Organic Constituents. Constituents of the Cell Wall

2848. Müller, O., and Dobberstein, H. Untersuchung der Hydrolyse des Buchenholzes durch kontinuierliche Leitfähigkeitsmessung. (Beiträge zur Chemie des Buchenholzes: V. Mitteilung). **[Investigation on the hydrolysis of Beech by continuous measurement of conductivity. (Contributions to the chemistry of Beech wood. Part V).]** *Makromolekulare Chemie, Heidelberg* 8 (2), 1952 (156–77). 18 refs. [G.g.e.] L.S.

During the hydrolysis of polysaccharides with 70–75% H_2SO_4 in a closed vessel, the concentration of the acid varies as a result of all reactions involving uptake or release of water molecules. This variation has been recorded by conductivity measurements, using a specially designed apparatus that has been calibrated with known substances. The following have been investigated: untreated wood; wood after alkaline or acid pretreatment; and the ClO_2-resistant wood residue. During total hydrolysis, lignin has been found to take up and to split off water, in a ratio of 1/3. The total amount of water of 'condensation' split off from the native lignin was 2·9–3·1% of wood weight. It has been confirmed that a portion of native lignin is resistant to ClO_2; this portion contains the groups that split water off, whereas the water uptake takes place in the aromatic component of wood. [Cf. *For. Abstr.* 11 (No. 1118).]

2849. Zaĭceva, A. F. Himičeskiĭ sostav drevesiny dvuh form letnego duba. **[Chemical composition of two forms of *Quercus robur*.]** *Žurnal Prikladnoĭ Himii, Moskva* 25 (10), 1952 (1098–101). 15 refs. [Russ.russ.] D.S.I.R.

No significant differences in chemical composition could be found between numerous wood samples taken from Oak trees belonging to two different forest types. Small but significant differences were found between *Q. robur* var. *praecox* and var. *tardiflora*; the former contains more cellulose (by 1–5%), pentosans (1–2%), lignin (0·1–1·3%), and methoxyl groups (0·3–0·8%), but less uronic acids (by 0·1–0·5%) and water-soluble substances (1·4%). [Cf. *For. Abstr.* 12 (No. 392).]

2850. Freudenberg, K., Reznik, H., Boesenberg, H., and Rasenack, D. **Enzyme systems taking part in lignification.** *Transl. For. Prod. Lab. Can.* No. 205, 1953. pp. 5. 5 refs. Transl. by J. W. Snyder from *Chem. Ber.* 85 (6), 1952 (641–7). [See *For. Abstr.* 14 (No. 657).] Limited distribution.

2851. Migita, N., Nakano, J., Ichino, M., and Mikawa, H. **Studies on lignin (XXI). The condensation product of pinosylvin with vanillyl alcohol, as a model compound of lignin.** *J. Jap. For. Soc.* 35 (10), 1953 (313–5). 4 refs. [E.jap.]

2852. Migita, N., Nakano, J., and Hashimoto, Y. **On the mechanism of colour reactions of lignin (III). The mechanism of the Mäule reaction (2).** *Bull. Tokyo Univ. For.* No. 45, 1953 (247–53). 13 refs. [E.e.jap.] (Studies on lignin (XV).)

Cf. *For. Abstr.* 14 (No. 2638).

2853. Bland, D. E., and Gatley, F. M. **Fractionation of lignin by chromatography.** *Nature, Lond.* 173 (4392), 1954 (32–3). 4 refs. [Division of Forest Products, C.S.I.R.O., Melbourne.]

Examination of the supposedly homogeneous lignin of *Eucalyptus regnans* by paper chromatography revealed at least 6 constituents—2 main lignin fractions and impurities.

2854. Semečkina, A. F., and Šorygina, N. N. Razloženie lignina metalličeskim natriem v židkom ammiake. V. **[Decomposition of lignin by Na metal in liquid NH_3.]** *Žurnal Obščeĭ Himii, Moskva* 23 (4), 1953 (593–5). 6 refs. [Russ.russ.] D.S.I.R.

Aspen cuprammonium lignin treated with Na metal in liquid NH_3 yielded ca. 18% by weight of low-molecular products of decomposition, among which 1-(4-oxy-3,5-dimethoxyphenyl-) propane and dihydroeugenol were identified.

2855. Stenius, Å. S. **The general discussion on cellulose held in Stockholm on July 31st, 1953. Part 1. The fibrillar structure of the wood cellulose fibre. Part 2. The molecular order and the chemical nature of the wood cellulose fibre.** *Svensk PappTidn.* 57 (1; 2), 1954 (9–18; 44–50). 8 refs. [E.G.] P.R.

Discussion on the subjects by a number of speakers.

2856. Koeppen, A. von, and Cohen, W. E. **A study of 'chlorite' and 'chlorine' holocelluloses prepared from *Eucalyptus regnans* F.v.M.** *Holzforschung, Berlin* 7 (4), 1953 (102–10). 35 refs. [E.e.g.] P.R.

2857. Stewart, C. M. **The non-resistant components of the wood of *Eucalyptus regnans* F. Muell. I. Water-soluble hemicellulose.** *Repr.* from *Aust. J. Chem.* 6 (4), 1953 (425–30). (*Repr. For. Prod. Aust.* No. 202.)

A xylosan uronide material has been extracted by water from the residues remaining after exhaustive methanol extraction of *E. regnans*. The fractions isolated from the xylosan uronide material appear to be chemically similar, the observed fractionation depending on physical properties. *From author's summary.*

2858. Stewart, C. M. **The non-resistant components of the wood of *Eucalyptus regnans* F. Muell. II. Polysaccharide constituents.** *Repr.* from *Aust. J. Chem.* 6 (4), 1953 (431–8). 26 refs. (*Repr. For. Prod. Aust.* No. 209.)

It is shown that the wood of *E. regnans* on hydrolysis with *N* H_2SO_4 yields an aldobiuronic acid containing 4-*o*-methyl-*d*-glucuronic acid and *d*-xylose residues. The composition of the non-resistant hemicellulose of *E. regnans* wood is compared with hemicelluloses obtained from various sources by other workers. The evidence suggests that the non-resistant hemicellulose *in situ* is composed basically of a poly-(hexaxylose 4-*o*-methyl-*d*-glucosiduronic acid) complex containing in addition acetyl groups and possibly galactose residues. *From author's summary.*

2859. Yamamori, N., and Tachi, I. **On the constitution of the hemicellulose prepared from Elm wood (*Ulmus davidiana* Planch. var. *japonica***

Nakai). *Memoirs of the College of Agriculture, Kyoto Imperial University* No. 57, 1950 (12–21). 5 refs. L.S.

Results of investigation have shown that the molecule of hemicellulose consists of 8 *d*-xyloses and 1 molecule of xyloglucuronic acid.

2860. Gustafsson, C., Wathén, K., and Saarnio, J. **Dissolving of carbohydrates from Spruce wood in heterogeneous hydrolysis with diluted sulphuric acid.** *Pap. ja Puu* 35 (11), 1953 (409 . . . 412). 8 refs. [E.e.] P.R.

Experiments with wood flour showed that the dissolving rate for mannan, glucan and xylan decreases rapidly with increasing time of reaction and the decrease is proportionably the same for all three. The results are discussed and it is concluded that crystallinity is probably not the only factor determining the rate of dissolving of carbohydrates and that it does not seem possible kinetically to determine the degree of crystallinity of polysaccharides using a heterogeneous hydrolytic dissolving process.

2861. Cvetaeva, I. P., Mukovnikova, M. K., and Nikitin, N. I. O himičeskom sostave drevesiny daurskoĭ listvennicy. **[Chemical composition of the wood of *Larix dahurica*.]** *Žurnal Prikladnoĭ Himii, Moskva* 25 (2), 1952 (174–90). 35 refs. [Russ.russ.] D.S.I.R.

Larix dahurica wood contains up to 20% of arabo-galactan extractable with hot water, almost all of which is found in the heartwood. Formula $(C_6H_{10}O_5)_6.C_5H_8O_4$ has been found for the arabo-galactan. A stepwise hydrolysis schedule has been worked out for the wood, yielding ca. 50% reducing substances, mostly mannose.

2862. Thompson, J. O., Becher, J. J., and Wise, L. E. **A physicochemical study of a water-soluble polysaccharide from Black Spruce (*Picea mariana*).** *Tappi* 36 (12), 1953 (541–3). 11 refs. P.R.

813.2. Minor Organic Constituents. Extractives. Cell Contents

2863. Roudier, A.; Roudier, A., and Eberhard, L. L'essai d'extraction à l'eau au cours de l'analyse des matières premières cellulosiques. **[Experiment in water-extraction during the analysis of cellulosic raw materials.]** Appendice. Extraction du bois de peuplier (× *Populus robusta* Schneider) par l'eau à 140°. **[Appendix. Extraction of wood of × *P. robusta* with water at 140° C.]** *Mémorial des Services Chimiques de l'État, Paris* 37 (2), 1952 (109–32 + 2 photos). 21 refs. [F.f.] L.S.

Loss of weight (and weight of extracts) of Spruce, Poplar, Oak and straw specimens when extracted with cold or hot water in several laboratories was determined. The obtained accuracy, although poor, is of the same order of magnitude as that with organic solvents. Sugars and polyoses in the extracts were studied. Extraction of Poplar with water at 140° C. was carried out and the results of analyses before and after hydrolysis are tabulated.

2864. Nakatsuka, T. **The occurrence of hinokitiol in the wood of *Thuja standishii* Carr.** *J. Jap. For. Soc.* 35 (9), 1953 (291–2). 3 refs. [E.jap.]

A yield of about 0·006% hinokitiol (β-thujaplicin) on the basis of oven-dry wood was obtained.

813.3. Ash Constituents

See also Nos. 2253, 2598.

2865. Bambergs, K., and Knāvina, M. **Content of mineral substances and micro-elements [trace elements] in healthy and in inner-rotten trees.** *Latvijas PSR Zinātnu Akademijas Vēstis, Riga* 1950 (8), (21–30). [[Latv.] russ.] From *Chem. Abstr.* 48 (2), 1954 (811i). P.R.

The sapwood (s.w.) of growing trees with heart rot was found to contain more phosphates, N, Zn and, frequently, more Mn than that of healthy trees. The rotten heartwood (h.w.) contained considerably more N, mineral substances and trace elements than h.w. of healthy trees; only the Cu content was somewhat lower. In the h.w. of rot-resistant Oak, Pine and Siberian Larch the content of Zn and, usually, phosphate was lower than in the s.w. of these trees, and also lower than in the wood of typical s.w. species. It is concluded that high phosphate, N and Zn, and low Cu, content makes some growing trees susceptible to heart rot.

813.4. Chemical Effects of Heat. Chemistry of Thermal Decomposition

See also Nos. 3081 *et seq.*

2866. Mitchell, R. L., Seborg, R. M., and Millett, M. A. **Effect of heat on the properties and chemical composition of Douglas-Fir wood and its major components.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (38–42, 72–3). 10 refs. [U.S. Forest Products Laboratory, Madison.]

Douglas Fir sections $\frac{3}{16} \times 1\frac{7}{8} \times \frac{1}{2}$ in., and sawdust, both free from extractives, and also lignin, α-cellulose and hemicellulose isolated from the sections, were heated at different temperatures for different lengths of time in a closed system under pressure and in an open system with and without circulation of air or N. Tabulated results show that the different conditions of heating had varying effects on chemical composition of the volatile products and the residue, on hygroscopic properties of the wood and the sawdust and its individual components, and on dimensional stability of the wood.

813.5. Reaction with Metals

See No. 3036.

813.6. Effect of Chemicals on Wood. Resistance to Chemical Attack

See No. 2822.

814. *Natural Durability. Old Wood. Fossilized Wood*

See also Nos. 2822, 2865, 2999–3000.

2867. Messeri, A., and Amico, M. d'. **Determinazione di frammenti di legno provenienti da una casa romana di Scedena (Tripoli). [Identification of fragments of wood from a Roman house at Scedena (Tripoli).]** *Nuovo G. bot. ital. (n.s.)* 59 (2/4), 1952 (197–200 + 4 photos). 1 ref. [It.it.e.] A.P.B.

Describes (with photomicrographs) two samples of subfossil wood, which are identified as *Tamarix* sp., probably *T. africana*.

815. *Effect of Growth Factors on Structure and Properties*

See Nos. 2347, 2819, 2833–5.

82. CONVERSION, SHAPING, ASSEMBLY AND FINISHING OF WOOD: GENERAL

2868. KOCZAN, S. P. **Summary of the use of tungsten carbide tipped woodworking tools in regular production.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (163–6).

Gives data from recent records at a woodworking plant showing performance of carbide-tipped and steel tools, and machines equipped with carbide-tipped tools.

2869. ENGLESSON, T. Slipningstekniken och dess betydelse för lönsamheten av högvärdiga eggmaterial vid träbearbetning. **[The technique of grinding and its importance for the economic use of high-grade material for cutting edges in woodworking.]** *Pap. ja Puu* 35 (11), 1953 (437–48). 12 refs. [Sw.e.] P.R.

Cf. *For. Abstr.* 15 (No. 1803).

821. *Barking*

2870. OHLSEN, B. **Barking machines.** *Transl. For. Prod. Lab., Can.* No. 59, 1953. pp. 10. Transl. by E. Perem from *Aktuell Information av Intern Natur, SDA, Stockholm*, July, 1952. P.R.

Gives some technical data on the following makes: (1) Anderson's, (2) Söderhamns Verkstader's transportable B12M, (3) Skoglund's type 12, (4) Sund's transportable BMB14P, (5) 'Mira' barker T212, and (6) 'Palmia'.

2871. GODFREY, G. E., and BELL, G. E. **Barking research at the Forest Products Laboratory, Ottawa, summer of 1952.** *Pulp Paper Mag. Can.* 55 (1), 1954 (102–4).

Describes with illustrations the new 'Curv-cut' head for buzz barkers, with the knives placed so that they describe a segment of a circle when the head is rotated, and some experiments on its use.

822. *Saws and Sawing*

See also Nos. 2880, 2910–2.

2872. Forslag til Norsk Standard for sagblad til trebearbeidelse. **[Proposal for a Norwegian Standard for sawblades for woodworking.]** *Norsk Skogind.* 7 (11), 1953 (424–7). [Nor.] (*Meddelelser fra Norges Standardiserings-Forbund* No. 245.) P.R.

Discusses briefly, in comparison with Swedish and Finnish standards, proposals for tooth types for circular saws, terminology for the different tooth angles, dimensions for ripsaw blades, dimensions for frame-saw blades and mountings for them.

2873. PAVIĆ, J. Uticaj kvaliteta brušenja gaterskih testera na potrošnju snage za rezanje. **[Effect of the quality of sharpening of frame-saw blades on the power consumption during cutting.]** *Glasn. šum. Fak., Beograd* 6, 1953 (43–9). 4 refs. [Serb.serb.e.]

Presents results of measurements of power consumption during the first 250–350 m. of cutting by frame-saw blades when (1) both the blue temper of the tooth points and the wire edge are retained, (2) the blue temper is left but the wire edge removed, (3) temper and edge are both removed. The power-consumption/cutting-length curves have similar shapes for all 3 cases, the ordinates being always highest for (1), and lowest for (3).

2874. SIMMONDS, A. **The art of saw doctoring wide bandsaws.** B. T. Batsford, Ltd., London. 1953. pp. 207. Price 18*s*.

2875. NOYON, F. Les fatigues de fonctionnement des scies à ruban et leur adhérence sur les poulies. Conclusions pratiques à en tirer. **[Wear and tear of bandsaws and pulley reeling. Practical conclusions.]** *Bois For. Trop.* No. 32, 1953 (31–4). [F.e.span.]

2876. ANTOINE, R. Le débit des bois à la scie à ruban. Étude du travail spécifique à l'outil. **[Conversion of timber by bandsaws. A study of energy consumption at the saw.]** *Bull. Inform. Inst. nat. Étude agron. Congo belge* 2 (6), 1953 (395–440). 5 refs. [F.f.]

Background theory for sawing colonial timbers, using as examples *Entandrophragma cylindricum*, *Polyalthia suaveolens*, *Pycnanthus angolensis*, *Fillaeopsis discophora*, *Celtis mildbraedii*, *Piptadenia leucocarpa* and *Celtis* sp. With the object of determining the optimum cutting speed (*M.O.*), defined as that involving least energy consumption at the saw (*Td* in KW./sq. dm.), the relation of *Td* to each of the following variables is graphically illustrated and discussed: all dimensions of the 'chip' (depth of cut, *H*; kerf, *V*; and bite), feed speed *A*, and saw speed (number of teeth/sec.), *VR*. Findings include the following: (1) Minimum *Td* at various *VR* corresponds to a constant *A*/*VR* ratio. (2) *Td* is a function of *V*, which should be kept as narrow as practicable, and directly proportional to *H*, so that *M.O.* is affected by an alteration in *A*/*VR* at the expense of *A*. (3) In soft timbers, gullet capacity limits *M.O.* in respect of *A*. (4) In conventional patterns of saw gullet, capacity is often very small and the shape unsuitable. The former could be improved at the expense of the clearance angle and the latter should be nearer circular to permit rolling the chip.

2877. EDAMATSU, N., and OHIRA, Y. **[Studies on methods of saw setting: the deformation of the point of the tooth in swaging.]** *Wood Ind., Tokyo* 8 (12), 1953 (532, 546–53). [Jap.e.] P.R.

2878. ENDERSBY, H. J. **Improved output from an inserted tooth saw.** *Wood* 19 (1), 1954 (11–4). 2 refs.

Standard teeth and teeth tipped with a cobalt/chromium/tungsten alloy were tested on Makoré (*Mimusops heckelii*) as representative of material having an abnormal blunting effect. Results given in a graph and photographs show the greater power needed in relation to output and the greater wear using the standard tooth.

2879. **Hard faced saw blades last 150 times longer before re-sharpening.** *Aust. Timb. J.* 19 (9), 1953 (643).

For cutting a considerable quantity of Walnut, a 16-in. saw blade was faced with Cobalide 3 (an Australian-produced cobalt/chromium/tungsten alloy). The method of facing and grinding is described. After facing, sharpening was done once a week instead of every 15 min. as previously.

823. *Planing, Cutting of Mouldings. Chiselling, Mortising and Tenoning. Boring. Turning*

2880. BRIGHTWELL, B. N. S. **Improvements in or relating to universal wood-working machines.** *Brit. Patent* No. 691,737, May 20, 1953. pp. 3 + 3 dgms. P.O.

A machine comprising a saw, a planing spindle, a table providing a supporting surface, and a cross-cutting attachment.

824. *Forms of Joint. Jointing and Assembly*

824.4. Dowelled Joints

2881. NEARN, W. T., NORTON, N. A., and MURPHEY, W. K. **The strength of dowel joints as affected by hole size and type of dowel.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (14–7, 72).

Cf. *For. Abstr.* 14 (No. 1551).

824.5. Timber Connectors

2882. **Teco. Design manual for Teco timber connector construction.** Timber Engineering Company, Washington. Revised, 1952. pp. 27. P.R.

824.8. Glues and Gluing

See also Nos. 2914 *et seq.*, 2998, 3065.

2883. BERGIN, E. G. **The significance of wood failure in glued joints.** *Repr.* from *Canadian Woodworker, Toronto* March, 1953. pp. 2. P.R.

The % wood failure, when considered in conjunction with the load at failure, is a valuable means for assessing the quality of a glue and of a glue bond.

2884. KUFFNER, E. J. **Tests of glue strength of Douglas Fir from northern interior and coast regions [of British Columbia].** *Res. Note U.B.C. For. Club* No. 1, 1950. pp. 4.

No difference was found in the gluing properties of Douglas Fir from these two provenances.

2885. SELBO, M. L., and OLSON, W. Z. **Durability of woodworking glues in different types of assembly joints.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (50–60, 220).

Results of exposing 11 different glues, representing 6 glue types and 7 types of assembly joints commonly used in furniture, to repeating cycles of changes in moisture content are given in graphs and tables.

2886. LÜTTGEN, C. Die Technologie der Klebstoffe. **[Technology of adhesives.]** Wilhelm Pansegrau Verlag, Berlin-Wilmersdorf. 1953, pp. [3 +]426. [G.] Price *DM*.34·80. P.R.

A comprehensive survey of patents and recipes for synthetic resin glues, and glues from cellulose derivatives, proteins, starch and dextrin, and other raw materials, is followed by a discussion of gluing methods, including a section on wood gluing.

2887. HYLER, J. E. **Glues and gluing. Parts 14 to 24.** *Sth. Lumberm.* 186 (2333), 1953 (71 . . . 76); 187 (2334–43), 1953 (45–8; 49 . . . 52; 59 . . . 64, 86; 49–56; 51 . . . 56, 86; 57 . . . 61; 55 . . . 60; 61 . . . 64, 84; 49 . . . 54, 66; 53 . . . 56).

Discusses the properties, uses and handling of different resin glues.

2888. DETWILER, E. B. **Properties and application of amino resin adhesives and binders.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (46–9, 218, 220). 4 refs.

2889. PLATH, E. Melaminharze in der Holzindustrie. **[Melamine resins in the wood industry.]** *Holztechnik* 34 (1), 1954 (9–12). [G.g.] P.R.

Discusses the use of melamine resin glues for plywood manufacture, and gives recipes and instructions for obtaining water-resistant and boiling-water-resistant plywood, using melamine-formaldehyde resin glues alone or in mixture with urea-formaldehyde and other glues, plus different extenders and hardeners. Graphs show, for a 1/1 Pressal/Kaurit mixture in Beech plywood, the effect of different factors on the water-resistance of plywood. The following recipe has been found suitable for manufacturing water-resistant plywood for indoor use: 100 parts by weight Pressal (melamine resin glue), 100 parts Kaurit W liquid (urea glue), 12 parts hot hardener '200', and 270 parts water.

2890. MELLER, J. G., and HILTON, R. J. (to Plywood Research Foundation). **Method of producing plywood.** *U.S. Patent* No. 2,635,066, April 14, 1953. pp. 10. P.O.

The glue used contains a thermosetting phenol-aldehyde resin dissolved in an alkaline medium, and a petroleum distillable hydrocarbon oil forming an emulsion with the resin-alkali medium. This emulsion does not penetrate into wood before application of the setting and curing temperatures and pressures.

2891. MÜLLER, A. Kaltleime auf Phenolharzbasis und die Gefahr der Holzschädigung. **[Phenol-resin-base cold-setting glues and the danger of damage to wood.]** *Holz Roh- u. Werkstoff* 11 (11), 1953 (429–35). 2 refs. [G.g.] P.R.

The excess of acid catalyst used with these cold-setting glues causes destruction of wood at higher temperatures that might well occur in practice. Methods of preventing this trouble are described.

2892. EGNER, K., and SINN, H. Beiträge zur Frage der Faserschädigungen durch sauer ausgehärtete Kunstharzleime. **[Problem of damage done to fibres by acid-hardened synthetic-resin glues.]** *Holz-Zbl.* 79 (156/157), 1953 (1679–81). [G.]

Describes the results of tests in the Technical University of Stuttgart on chips and long pieces of wood, and special test pieces. It was found that: (1) the acid-hardened phenol-resin glues (*a*) quickly cause perceptible fibre damage in wood chips at 40° C. and high relative humidity ($\geqslant$ 85%, hence moisture content of chips $\geqslant$ 14%); (2) in glued long

pieces (DIN 53254 standard) only qualitative results could be obtained for some minor factors; (3) while ASTM: D 143–52 test pieces glued with resorcinol-resin glues give practically the same transverse tensile strength values as solid test pieces, lower values are obtained for (*a*), these differences becoming very great for test pieces stored alternately in 5 different conditions of temperature and humidity.

2893. Tigelaar, J. H. **Techniques for bonding metals and plastics to wood.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (41–5, 218). 16 refs.

Discusses types of adhesives and methods used. [Cf. *For. Abstr.* 15 (No. 1840).]

2894. Tibaldi, A. Qualche risultato di impiego del riscaldamento ad alta frequenza nell'industria del legno. [**Some results of the use of dielectric heating in the wood industry.**] *Quaderni di Studi e Notizie, Societá Edison, Milan* 9 (148), 1953 (425–32). [It.] L.S.

Reviews the use of dielectric heating in the manufacture and bending of plywood, bending solid wood members, seasoning etc., and gives some figures for consumption of energy in different operations.

2895. Kuenzel, J. G., Poletika, N. V., and McKean, H. B. **The gluing of preservative-treated wood for severe service conditions.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (35–40). 15 refs.

A review of new developments, some test results, and strength requirements.

825. *Cleaving. Adzing. Mechanical Comminution*

See also No. 2943.

2896. Behr, E., Kuhn, E., and Kempter-Behr, M. **Improved machine for producing long thin longitudinal fibred wood chips for wood chip boards and the like.** *Brit. Patent* No. 690,584, April 22, 1953. pp. 3 + 6 dgms. P.O.

The machine has a rotating cup wheel, to the ring portion of which the cutter knives are secured, these knives protruding through the inner periphery of the ring; pieces of waste wood are pressed against the cup wheel so that the knives cut off long, thin, longitudinal-fibred wood chips.

826. *Peeling. Slicing. Trimming, Edging etc. of Thin Sheets*

2897. Hyler, J. E. **Veneer knives and their grinding.** *Veneers & Plyw.* 47 (12), 1953 (8, 16 . . . 19). P.R.

Discusses the following subjects: importance of the right degree of bevel and comparison of flat and concave bevel; use of cup-type wheels in grinding devices; protection of knife edges; care of abrasive wheels; importance of face grinding to restore the perfect flatness of the face.

827. *Bending. Moulding (other than by Cutting)*

See also No. 2894.

2898. Fessel, F. **Machines for moulding wood without cutting.** *Transl. Commonw. sci. industr. Res. Organ. Aust.* No. 1986, 1953. pp. 24. 21 refs. Transl. by M. Slade from *Holz Roh- u. Werkstoff* 10 (4), 1952 (157–70). [See *For. Abstr.* 13 (No. 4263).] Limited distribution. P.R.

829.1. *Finishing*

See also Nos. 2939, 3036.

2899. Kasei, S., and Ichihara, A. [**Studies on sanding (Part 2).**] *Wood Ind., Tokyo* 8 (8), 1953 (336, 362–6). 8 refs. [Jap.e.] P.R.

[Cf. *For. Abstr.* 15 (No. 1843).] The following results were obtained with a standard sandpaper on the effect of different variables: (1) Abrasive capacity on quarter- and flat-sawn surfaces was similar, but on transverse surfaces was less than $\frac{1}{8}$ and decreased rapidly with time of abrasion. (2) Abrasive capacity was greater on woods with low than with high moisture content. (3) For the 9 species tested, abrasive capacity varied inversely with the sp. gr. (4) The size of the abrasive particles must be considered in conjunction with their cutting depth and their number per unit area.

2900. Gordon, O. B. **Sanding wood for finishing.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (126–8).

Discusses methods and equipment.

2901. Fisher, J. R., and Price, J. E. (to Chadeloid Corp.). **Stain-filler emulsion and method of applying same.** *U.S. Patent* No. 2,565,602, Aug. 28, 1951. pp. 8. P.O.

A rapid-drying coating composition of the combined filler-stain type which, after complete drying, allows the wiping off of any excess of coating composition; it consists of a resin (alkyd, phenol-formaldehyde etc.) dissolved in tetrahydrofurfuryl alcohol with a dye solution and fillers.

2902. Marian, J. E. Forschung und Erfahrung bei Kunstharzbehandlung von Holz, insbesondere Holzfussböden. [**Research and experience in the treatment of wood, particularly wooden floors, with synthetic resins.**] *Holz Roh- u. Werkstoff* 11 (11), 1953 (440–6). 39 refs. [G.g.] P.R.

Survey of research on, and use of, durable (permanent) wood flooring finish in the U.S.A. and Sweden.

2903. Browne, F. L. **The absorption of water, swelling and solubility of free films of paint.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (108–25, 226). 40 refs.

83. TIMBER MANUFACTURING INDUSTRIES AND PRODUCTS. USES OF WOOD AS SUCH

831. *Fuelwood and Various Types of Rough Timber*

See also Nos. 2831, 2844, 2968, 2972–7, 2983–4, 3006, 3015.

2904. Croix-Vaubois, de la. Le bois de mine. [**Mine timber.**] *Revue de l'Industrie Minérale, Paris* 34 (593), 1953 (343–58). [F.] L.S.

A general account of French requirements and needs, domestic supplies, market conditions, and mine-timber manufacture.

2905. Woods, R. P., and Moss, D. H. **The practical usage of square and round piles**. *Quart. Rev. Timb. Developm. Ass.* 3 (12), 1954 (18–22).

American practice favours round, and British, squared piles. The different dimensions, specifications and methods, and the relative merits of the two types as regards timber economy, strength, durability, preservative treatments and fixing are discussed.

2906. Graham, P. H. **Preparing poles for posterity**. *Wood-Worker, Indianap.* 72 (11), 1954 (12–3, 50–2, 59). P.R.

Describes the barking, handling, impregnating, framing and drilling of power transmission and telegraph poles.

2907. De'patel, K. V. **Wooden posts for telecommunication lines**. *Telecommunications, Jabalpur* 3 (1), 1953 (13–6). L.S.

Describes the experience of the former Travancore state administration in the use of Ascu-treated Teak poles for telecommunication lines.

2908. Burger, H. Das 'Arbeiten' imprägnierter Leitungsmasten. [**Warping in preservative-treated transmission poles.**] *Mitt. schweiz. Anst. forstl. Versuchsw.* 29 (2), 1953 (177–88 + 2 photos + 1 gph.). 19 refs. [G.g.f.]

Transmission poles in Switzerland are usually of Spruce or Silver Fir, treated, before barking, by the Boucherie method. As the author has already shown [cf. *For. Abstr.* 4 (110)] the grain of these species is almost always twisted from right to left in youth, then often becomes straight, and finally turns from left to right. Among poles of 18–26 cm. d.b.h.: (*a*) about one-third have remained with right-to-left twist throughout, (*b*) one-third have straight grain in the surface layers, and (*c*) one-third have left-to-right twist on the surface. When they begin to dry after preservative treatment, the poles warp in varying degrees according to the direction of the surface grain, the greatest amount of warping occurring in (*a*) (17–50% of 10-m. poles) and much less in (*b*) and in (*c*) where the interior and exterior torsions balance each other. Poles of type (*a*) are not really suitable for use as transmission poles, but as long as treatment is carried out on unbarked poles, it is impossible to reject them in the forest. [Cf. *For. Abstr.* 14 (No. 1566).]

832. *Mills, Their Functions and Products*

832.1. Sawmills and Planing Mills

See also Nos. 2754, 2872 *et seq.*, 3035.

2909. May, R. H. **A century of lumber production in California and Nevada**. *For. Surv. Release Calif. For. Range Exp. Sta.* No. 20, 1953. pp. 33. 5 pp. of refs.

Gives figures for sawn timber production and number of sawmills, and production by species, by lumber region, by county and by size class.

2910. Thunell, B. Forschung und Entwicklung auf dem Gebiete der Sägewerkstechnik. [**Research and development in the field of sawmill engineering [in Sweden].**] *Holz Roh- u. Werkstoff* 11 (11), 1953 (420–9). 9 refs. [G.g.] P.R.

Both frame- and circular-saw mills are found, the former consisting, as a rule, of one or more production lines each of ca. 25,000 cu.m. (converted) annual capacity. The latter are more diversely organized and produce timber of less accurate dimensions. There are in all, 8000 sawmills in Sweden with a total annual output of 5,600,000 cu.m.

2911. Lonkai, J. Fürészüzemek müszaki anyagnormáinak meghatározása. [**Calculation of [sawn timber] assortment norms in sawmills.**] *Erdö* 1 (1), 1952 (66–79, 96, 100). [Hung.russ.g.]

2912. King, W. K. **The effect of log diameter and milling equipment on sawmill residues**. *J. For.* 51 (12), 1953 (897–906). 4 refs.

In integrated utilization, residues will probably be treated chemically, and weight, not volume, correlations are required. The oven-dry weight % of bark, sawdust, chippable material and total solid residue (slabs, edging, trim) are compared with diam. (*D*) of log and with 6 mill types (3 portable circular, 3 band mill) for southern Yellow Pine and for hardwoods (Oak and Gum) in E. Texas. Regressions are given for the following (correlated with *D*): Pine bark, portable mills; hardwood bark, all mills; solid and chippable residues, all mills, all species. Outturn tables constructed on the data and weighted for local diam. distribution, show the estimated tons (green and oven-dry) of each residue component for Pine and hardwoods and for each mill type separately per 1000 bd. ft. green lumber tally, Doyle-Scribner rule and International $\frac{1}{4}$-in. rule. Mean values have been used for part of the bark and all the sawdust data where, for local causes stated, no correlation with *D* was found.

832.2. Veneer and Plywood Mills, including the Manufacture of Composite-Wood Assemblies

See also Nos. 2837–8, 2883 *et seq.*, 2897.

2913. Saks, E. V. **Tropical Mahogany production**. *Sth. Lumberm.* 187 (2345), 1953 (127–30).

Discusses the figure in wood from *Swietenia* spp., methods of cutting veneers to give the best figure, and logging operations in central America.

2914. Knight, R. A. G. **Trials of timbers for plywood manufacture**. *Wood* 19 (2), 1954 (76–80).

Summarizes in tabular form results of research on the processing required, and yield and properties of plywood from 44 species, and classifies the timbers tested into 4 groups.

2915. **Trials of timbers for plywood manufacture. Progress Report 23. Consignment No. 785. Agba—*Gossweilerodendron balsamiferum* Harms—Nigeria**. Forest Products Research Laboratory, Princes Risborough 1953. pp. 14.

2916. Dulioust, G., and Métro, A. Utilisation de bois marocains pour la fabrication de contreplaqués. [**The use of Moroccan timbers for plywood.**] *Ann. Rech. for. Maroc 1952*, 1953 (217–27). [F.]

An account of experiments with wood of Morocco-grown *Eucalyptus globulus* and *E. rostrata*, which gave promising results.

2917. Bauer, F. Wertholzanteil und Furnierfähigkeit der Roteiche. **[Per cent. of high-quality timber in *Quercus borealis* and its suitability for veneer.]** *Holz-Zbl.* 80(4), 1954 (23–5). 3 refs. [G.g.]

Analysis of the yield plots in West Germany shows that, in 100-year-old stands on sites of 1st quality, the stems attain the size and quality required for veneer logs. When properly tended, the % of quality timber in the stands amounts to 25%, i.e. ca. twice the figure so far attained for native Oak stands. The wood of *Q. borealis* differs from common Oakwood by larger vessels and a greater % of early wood. Its average hardness is independent of ring width; the hardness is lower in sites with a warmer climate. Peeling tests have proved the wood suitable for veneer manufacture. [Cf. *For. Abstr.* 14 (No. 3615).]

2918. Fleischer, H. O., and Lutz, J. F. **Heating veneer logs.** *Wood Wkg. Dig.* 55 (12), 1953 (161 . . . 6). 3 refs. P.R.

Results of tests at Madison show that heating in water gave a more uniform temperature distribution and better quality rotary veneer than steaming at 220° F. [Cf. *For. Abstr.* 10 (No. 1196).]

2919. Fleischer, H. O., and Downs, L. E. **Heating veneer logs electrically.** *Rep. U.S. For. Prod. Lab., Madison* No. 1958, 1953. pp. 7 + 5 photos, 1 gph., 1 tbl. 4 refs. P.R.

Presents some typical data (time, voltage, current, and power consumption; also average temperature attained, and temperature range) for Yellow Birch, Red Oak, White Oak, Water Tupelo and Swamp Tupelo logs.

2920. **Czechoslovakian designs: details of two veneer machines offered for export.** *Timb. Tr. J.* 207 (4033), 1953 (2324–5).

2921. Perry, T. D. **Corrugated plywood.** *Sth. Lumberm.* 187 (2345), 1953 (191–5).

Describes the manufacturing processes and equipment and the properties of a corrugated plywood made by Industrias Maderit, S.A., São Paulo, Brazil.

2922. Chelvarajan, B. K. **Comparative study of Indian and American plywood shear test standards.** *Indian For.* 80 (1), 1954 (47–53 + 2 plates). 7 refs.

2923. Curry, W. T. **The strength properties of plywood. Part 1. Comparison of 3-ply woods of a standard thickness.** *Bull. For. Prod. Res., Lond.* No. 29, 1953. pp. 10 + 4 photos. Price 1*s.* 3*d.*

Bending, tension, compression, shear and impact strength tests were made on $\frac{3}{16}$-in. plywood specimens, made under controlled conditions from 25 species, many from Africa. The tabulated results show that *Betula lutea* plywood has the best shear strength properties.

2924. Larsson, G., and Wästlund, G. Plywood som konstruktionsmaterial. **[Plywood as a material in constructional design.]** *Medd. Komm. Byggnadsforskn., Stockholm* No. 21, 1953. pp. 120. 126 refs. [Sw.e.] Price *Kr.*7. P.R.

The first section of the book deals with the strength characteristics of plywood and tests for their determination; the second (by G. Larsson only) deals with the cross-sectional design of beams with plywood webs, particular attention being paid to the strength and stability of these webs.

2925. Saks, E. V. **The fine points of lumber-core production.** *Wood-Worker, Indianap.* 72 (10), 1953 (16–7, 45–6, 48, 50). P.R.

Describes American practice in making cores for blockboards.

2926. Lawlor, J. J. **An application of statistical methods to the thickness control of lumber core panels.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (16–8).

Discusses the construction of control charts, and their use. [Cf. *For. Abstr.* 15 (Nos. 2938, 3016, 3064).]

2927. Norris, C. B., Boller, K. H., and Voss, A. W. **Wrinkling of the facings of sandwich construction subjected to edgewise compression. Sandwich constructions having honeycomb cores.** *Rep. U.S. For. Prod. Lab., Madison* No. 1810-*A*, 1953. pp. 15 + 1 photo + 1 dgm. + 4 gphs. + 4 tbls. 4 refs. P.R.

Mathematical. Equations governing the wrinkling and a method of design are presented.

2928. Ericksen, W. S. **The bending of a circular sandwich panel under normal load.** *Rep. U.S. For. Prod. Lab., Madison* No. 1828 (rev.) 1953. pp. 34 + 1 dgm. + 1 gph. 5 refs. P.R.

Mathematical. Develops formulae for the deflection and stresses within a normally loaded circular sandwich panel.

2929. Norris, C. B., and Kommers, W. J. **Stresses within a rectangular, flat sandwich panel subjected to a uniformly distributed normal load and edgewise, direct, and shear loads.** *Rep. U.S. For. Prod. Lab., Madison* No. 1838, 1953. pp. 11 + 2 photos + 1 dgm. + 2 gphs. + 1 tbl. P.R.

Presents approximate formulae for the deflections, bending moments, shear loads and reactions of panels. The deflection formula was confirmed by tests on panels with aluminium facings and end-grain Balsa cores.

2930. Whiton, A. L. **Craveneer as used in the packaging field.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (103–4).

Discusses the manufacture and properties of Craveneer, a product of the Chicago Mill and Lumber Company, composed of a sheet of single-ply veneer, with a sheet of 42 lb. kraft paper laminated to each side.

2931. Sugano, M., and Nishihara, M. **[Preparatory tests of glued laminated arches for use in building construction.]** *Wood Ind., Tokyo* 8 (9), 1953 (389, 406–8). 3 refs. [Jap.e.] P.R.

Tests were made on a laminated arch of *Cryptomeria japonica*, 10-ply, cross-section 50 × 75 mm., radius 1460 mm., glued with urea-formaldehyde resin; the glue was cured at 60° C. in the outer and 40° in the inner glue line for 3 hr. Shear strength and wood failure were respectively 67·9 kg./sq. cm. and 91·6% for the outer and 60·3 kg./sq. cm. and 93·8% for the inner glue line. After an accelerated durability test delamination was nil. *From authors' summary.*

2932. Hirai, S., and Fukui, H. [**Studies on laminated assemblies from sawn boards. II. The adhesive strength of joints at defects in a laminated assembly from *Cryptomeria japonica*.**] *Bull. Tokyo Univ. For.* No. 45, 1953 (223–35). 7 refs. [Jap.e.]

Joint strengths of assemblies from clear wood were compared with those from wood containing (1) knots, (2) decay, and (3) cross grain. Results are given in tables [with English legends]. (1) In tests on dry assemblies adhesive strength at and in the neighbourhood of knots was significantly lower than for clear wood, but there was no difference between the joints after immersion in water at 50–60° C. for 3 hr. (2) There was no difference between adhesive strength of joints at a point where the wood was decayed and in sound wood. (3) The difference in adhesive strength between joints with cross- or straight-grained wood was generally insignificant, but in some tests the cross-grained joints were considerably weaker. [Cf. *For. Abstr.* 14 (No. 767).] *From authors' summary.*

2933. **Determination of working stresses for glued laminated structural lumber.** West Coast Lumbermen's Association, Portland, Ore. 1951. pp. 10 + 9 gphs. + 17 tbls. P.R.

833. *Timber in Buildings and Engineering Structures (Manufacture and Use)*

833.1. Building Components and Fittings: General

See also Nos. 2807, 2902, 2924, 2931–3.

2934. Verrall, A. F. **Decay prevention in wooden steps and porches [and other exterior woodwork] through proper design and protective treatments.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (54–60). 4 refs.

833.8. Wood in Hydraulic, River and Marine Uses

2935. Woods, R. P. **Timber for marine work [with discussion].** *Rec. [3rd] Conv. Brit. Wood Pres. Ass. 1953* [1954?] (20–36).

Lists some species used in the U.K. in sea defence groynes, docks and harbours, giving particulars of dimensions and preservatives used, and some information on performance. [Cf. *For. Abstr.* 14 (No. 2750).]

834. *Shingles. Cooperage. Packing Containers. (Manufacture and Use)*

See No. 2930.

835. *Industrial and Domestic (Utility) Woodware. Toys and Models. Sports and Recreational Goods. Musical, Scientific and Mathematical Instruments. Surgical Applications etc.*

2936. Freeborn, K. L. C., and Cheney, D. A. **Alternative timbers for last making.** *Report, British Boot, Shoe and Allied Trades Research Association, Kettering* No. *T.M.*1116, 1953. pp. [2] + 44 + 1 dgm. + 7 tbls. P.R.

Presents the results of tests on *Guarea thompsonii*, *G. cedrata*, Abura (*Mitragyna macrophylla*), Afina (*Strombosia pustulata*), *Afrormosia elata*, Makore (*Mimusops heckelii*), Coigue Beech (*Nothofagus dombeyi*), Tasmanian Myrtle (*N. cunninghamii*), Danta (*Cistanthera papaverifera*), Kanluang[*Adina cordifolia*), Lagos Mahogany (*Khaya ivorensis*), *Mansonia altissima*, *Marquesia* sp., Obeche (*Triplochiton scleroxylon*), Rhodesian Teak (*Baikiaea plurijuga*), and Thingan (*Hopea odorata*). Thingan has been found to be the best so far tested as an alternative to Maple and Beech. Kanluang, *G. cedrata*, Rhodesian Teak, and Coigue Beech have been found to justify further consideration.

2937. Conesa, G. Une industrie traditionnelle de l'Algérie se meurt: la fabrication des ébauchons de pipes de bruyère. [**A traditional Algerian industry is dying: the manufacture of briar pipe blanks.**] *Chêneliège* 60 (1481), 1954 (33–7). [F.]

Discusses the good qualities of Algerian pipes and the present paralysis of the industry, which is considered to be due to excessively high prices.

836. *Furniture and Cabinet-Making. Carving. Marquetry. Wooden Ornaments*

2938. Calahan, R. C. **Quality control in furniture manufacturing.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (19–24, 209–10). 6 refs.

Outlines a plan for establishing quality control in a furniture plant and give some examples of the use of control charts in studying accuracy of dimensions, quality of incoming timber, and efficiency of loading. [Cf. *For. Abstr.* 15 (Nos. 2926, 3016, 3064).]

838. *Vehicles (including Ships, Boats, Aircraft)*

2939. Peck, E. C. **Reducing checking in heavy White Oak shipbuilding material during storage and construction.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (22–3). [U.S. Forest Products Laboratory, Madison.]

Five surface treatments and two storage methods were tested for their effectiveness in preventing checking and splitting of White Oak in 3 × 8 × 42-in. pieces. All surface treatments reduced surface- and end-checking, which was least in specimens coated with paint. Urea-aldehyde paste reduced surface- and end-checking except in exposed specimens where the coating was washed off by rain. A wood sealer and a water-repellent preservative gave moderate protection; NaCl reduced surface-checking in a stickered pile protected by a roof. Untreated material placed in a rack and exposed to the weather was more severely checked than that in a stickered storage pile protected by a roof.

839.2. *Wood Flour and its Manufacture*

2940. **Use and manufacture of wood flour.** *Wookwkg. Ind.* 11 (1), 1954 (46–7). P.R.

Most of the wood flour in the U.K. is manufactured from waste of *Pinus sylvestris*, *Picea abies* and *Pseudotsuga taxifolia*. The home production (1949–51) averages 33,000 tons p.a. The uses of wood flour are described.

839.8. *Industrial Waste Wood, its Processing and Uses*

See also Nos. 2460, 2912, 2998, 3035, 3039, 3053, 3054 *et seq.*

2941. Žučkov, P. A. Suška i sžiganie drevesnyh othodov. **[Drying and burning of wood waste.]** *Bumažnaja Promyšlennostj, Moskva* 28 (3), 1953 (20–3). [Russ.] L.S.

Discusses measures to raise the efficiency of furnaces fed wholly or partly with wood waste of high moisture content: pre-drying of wood waste (1) in a specially designed portion of the furnace, (2) in separate driers, and (3) by the heat of flue gases. Four appliances are described and illustrated.

2942. **Alloy pigs from hogged fuel.** *Chemical Engineering, Albany* 60 (6), 1953 (122, 124). L.S.

Adding large quantities of wood waste (also sawdust) to electric smelting furnace charges makes these charges more porous, helps to control the feed rate and the smelting temperature, and prevents the formation of slag from melted, but unreduced ore (e.g. pyrophyllite).

2943. McIntyre, A. C. **Wood chips for the land.** *Leafl. U.S. Dep. Agric.* No. 323, 1952. pp. 8. H.S.B.

General information on chipping machines and use of chips as bedding for cattle and poultry, and for soil and crop improvement.

2944. Walter, R. **Wood chips for mulching and humus.** *Shade Tree* 26 (11/12), 1953 ([1]–[4]).

Describes a method of composting hardwood chips used in New Jersey. The chips are dumped in the composting area and watered. When a sufficient quantity has accumulated, the chips are transferred into composting heaps, 6 ft. high, 5 ft. wide and of any length. It is important that the width should not exceed 5 ft., so as to allow full access to air. The heaps are depressed on top to hold water. An N-fertilizer solution is injected into the heaps with an ordinary feed-pipe until saturation is reached. The solution contains enough $NaNO_3$ to supply ca. 2 lb./cu. yd. of packed wood chips. Watering with the same solution is repeated 4 weeks later and no further attention is necessary. The decomposition period varies with the size of chip and season of the year; chips from branches with foliage decompose quicker than those produced in the dormant season. For best results, summer chips should be composted for a year and dormant chips for about a year and a half. Notes are given on the use of the resulting compost.

2945. Newton, W. **Seed germination and seedling growth as influenced by different kinds of sawdust.** *Canad. J. agric. Sci.* 33 (6), 1953 (593–6 + 1 plate). O.R.E.

Seed germination and subsequent seedling growth of garden peas, beans, and sweet peas was greatly depressed when the seed was planted in pure Cedar (*Thuja plicata*) sawdust as compared with soil, but little or no depression occurred when the seed was planted in Fir (*Pseudotsuga taxifolia*), Hemlock (*Tsuga heterophylla*), and Balsam (*Abies grandis*) sawdusts. Balsam slightly accentuated the growth of beans and sweet peas. The incorporation of all four sawdusts at 20% and 30% by volume with soil, depressed the germination of radish seed and subsequent seedling growth as compared with soil alone. These effects were particularly marked with Cedar sawdust. Balsam sawdust caused the least and Fir the greatest depression in the germination of radish seed, whereas Fir sawdust caused the least and Balsam the greatest depression in subsequent seedling growth. An explanation of this inverse relationship is presented. *Author's summary.*

84. PRESERVATION AND OTHER TREATMENTS TO IMPROVE THE PROPERTIES OF WOOD. DAMAGE BY BIOLOGICAL AGENCIES AND ITS CONTROL. SEASONING. TIMBERYARD PRACTICE

See also No. 3038.

841. *Wood Preservation*

See also Nos. 2831, 2895, 2905–8, 2934–5, 2988, 3001–2, 3008–10.

2946. **Wood preservation.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1903–18, 1953. pp. 29 + 1 photo + 3 tbls. 31 refs. P.R.

Includes information on: wood preservatives; preparing timber for treatment; methods of preservation; handling and seasoning after treatment; and effect of treatment on strength.

2947. Schempp, K. Erforderliche Holzschutzmassnahmen im Bauwesen und auf anderen Wirtschaftsgebieten. **[Necessary wood preservation measures in building construction and other fields.]** *Werkstoffe und Korrosion, Weinheim* 2 (2), 1951 (51–4). [G.] L.S.

An account of research done by the Deutsche Gesellschaft für Holzforschung, and of modern preservation techniques. Includes a diagram showing 10 grades of wood protection as proposed by E. Gieseking.

2948. Becker, G. **Recent research and development in wood preservation in Germany [with discussion].** *Rec. [3rd] Conv. Brit. Wood Pres. Ass. 1953* [1954?] (37–58). 116 refs.

Reviews literature on biological tests of preservatives, tests on leaching, penetration, effects of preservatives on timber strength, and reactions of preservatives with metals and lime, on research on methods of preservation and the detection of preservatives, and on developments in methods of application.

2949. Benoit, J., and Jacquiot, C. **The main problems of wood preservation in France [with discussion].** *Rec. [3rd] Conv. Brit. Wood Pres. Ass. 1953* [1954?] (109–26).

The main subjects discussed are preservation of felled timber, dry-rot and damage by *Hylotrupes bajulus* and ambrosia beetles.

2950. Dale, F. A. **Preservative treatment of *Pinus radiata*.** *For. Prod. News Lett. C.S.I.R.O. Aust.* No. 195, 1953 (4–5).

Lists successful methods of preserving round and sawn timber and some special treatments, and discusses the economics of treatment and the use of

treated *P. radiata* rather than naturally durable timbers.

2951. **Report of Committee D-7 on wood.** *Prepr. Proc. Amer. Soc. Test. Mater.* No. 38, 1953. pp. 15. P.R.

Includes proposed tentative specifications for: copperized chromated $ZnCl_2$; pentachlorophenol; chemical analysis of copperized chromated $ZnCl_2$; chemical analysis of pentachlorophenol, and proposed revised standard specifications for creosote, and creosote/coal-tar solution.

2952. Heiks, R. E. **Investigation of the fundamental characteristics of creosote oils: 1. Preliminary studies.** *Proc. Amer. Wood Pres. Ass.* 48, 1952 (53–83). 4 refs. P.R.

Presents results of infra-red spectral studies and selective solvent extraction studies of 7 American petroleum oils, and 16 samples of creosote from various parts of the world, for which detailed information on coal carbonization, distillation, and blending are reported. Qualitative infra-red spectra for each oil indicate that the creosote oils differ significantly from the petroleum oils. Quantitative infra-red studies have revealed interesting relationships between the aliphatic (and naphthenic) and the aromatic C–H groups present in the samples. A distinct difference between the creosote oils as a group and the petroleum oils, found in the selective solvent extraction studies with β-β'-oxydipropionitrile, points to the possibility of a method of distinguishing between aromatics with a high order of aliphatic substitution and those with lower or no aliphatic substitution.

2953. Rouzet, L. (to Société des Laboratoires de Recherches pour Applications Industrielles). **Wood preservative comprising chlorinated phenolics, anthracenic oils, and creosotes.** *U.S. Patent* No. 2,605,206, July 29, 1952. pp. 4. P.O.

The example of the preservative in a mixture of coal-tar anthracenic coke, naphthalene, parachlormetacresol, and fuel oil.

2954. Jenet, A. Composition pour l'imprégnation du bois à froid. [**Mixture for cold impregnation of wood.**] *French Patent* No. 991,999, Oct. 12, 1951. pp. 4. [F.] P.O.

An example of the mixture is one containing creosoted heavy oil, crude light oil, benzole, coal tar, and dinitrophenol.

2955. Österreichische Stickstoffwerke Aktiengesellschaft. Verfahren zur Konservierung bzw. Imprägnierung von Holz. [**Method of preserving or impregnating wood.**] *Austrian Patent* No. 173,851, Feb. 10, 1953. pp. 2. [G.] P.O.

The preservative is phenylacetic acid in which one or more H atoms in the phenyl radical are replaced by halogens and/or the nitro group.

2956. Uenzelmann, W. (to Th. Goldschmidt A.-G.). Verfahren zur Herstellung von Holzkonservierungsmitteln aus chlorierten Phenolen und Phenolgemischen. [**Method of obtaining wood preservatives from chlorinated phenols and mixtures of phenols.**] *German Patent* No. 851,687, Oct. 6, 1952. pp. 2. [G.] P.O.

During or after chlorination the phenols are sulphonated either completely or partly and then converted into water-soluble salts.

2957. Ettel, V. (to Spolek pro chemickou a hutni vyrobu, narodni podnik). **Process of impregnating wood with soluble arsenical compounds.** *U.S. Patent* No. 2,590,162, March 25, 1952. pp. 6. P.O.

Wood is treated with an aqueous solution of thioarsenite (concentration 1–3%) of Ca, Sr, Ba or Mg, and then allowed to dry in the air, thus transforming the compound into an insoluble form.

2958. Osmose Holzimprägnierung and Schmittutz, C. Perfectionnements apportés aux produits d'imprégnation pulvérulents et cristalloïdes pour le bois. [**Improved wood preservatives in powder or crystal form.**] *French Patent* No. 993,654, Nov. 5, 1951. pp. 3. [F.] P.O.

Na_3AsO_4 (or KH_2AsO_4) and $Na_2Cr_2O_7$ (or $K_2Cr_2O_7$), in different proportions, without or with $HgCl_2$, NaCl, NaF, potato or rice starch, Turkey red oil, and $KHSO_4$.

2959. Hadert, H. Chromate als Korrosionsverzögerer in Holzschutzmitteln. [**Chromates as corrosion inhibitors in wood preservatives.**] *Werkstoffe und Korrosion, Weinheim* 2 (2), 1951 (49–51). 3 refs. [G.] L.S.

Discusses the changes in the rate of corrosion of iron or steel in contact with preserved wood, caused by the addition of chromates and dichromates to salt preservatives.

2960. Švalbe, K. **Use of selenium and its compounds for conservation of wood.** *Latvijas PSR Zinātnu Akademijas Vēstis, Riga* 1949(6), (101–15). [Latv.russ.] From *Chem. Abstr.* 48 (1), 1954 (317e). P.R.

Impregnation of wood with 0·125% colloidal solution of Se gave good protection against *Coniophora cerebella.*

2961. Strache, F. Ein Verfahren zur quantitativen Bestimmung von fluorhaltigen Schutzmitteln im Holz. [**Method of quantitative determination of F-containing preservatives in wood.**] *Holzforschung, Berlin* 7 (4), 1953 (111–6). 23 refs. [G.g.e.] P.R.

A wood specimen of 0·1 g. is oxidized by Na_2O_2, and the F content is determined, following distillation with H_2SO_4 or $HClO_4$, by titration with $Th(NO_3)_4$, using a suitable indicator. The greatest accuracy is obtained with ca. 1 mg. of F.

2962. Walters, C. S. **The effect of solvent characteristics on the blooming of pentachlorophenol.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (61–6, 74–5). [Illinois Agricultural Experiment Station.]

Tests were made on sapwood blocks of Ponderosa Pine and Yellow Poplar using pentachlorophenol with diluents blended with 6 oils. Results showing the amount of bloom after different drying periods are given in graphs and tables.

2963. Hudson, M. S. **Recovery of organic solvents from wood pressure impregnated with solutions of copper naphthenate or pentachlorophenol.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (177–82, 230, 232). 3 refs.

The method used was a modified vapour-drying process. [Cf. *For. Abstr.* 13 (No. 4322).]

2964. Hudson, M. S. **Method of removing excess impregnant from impregnated wood.** *Brit. Patent* No. 687,113, Feb. 4, 1953. pp. 4. P.O.

The impregnated wood is heated in a closed space by introducing vapour of an organic solvent of suitable boiling point, the excess impregnant in the outer wood layers being effectively expanded and forced to the surface where it is dissolved by the condensed solvent, the condensate and extracted excess being recovered.

2965. Cosgrove, J. T. **Pressure creosoting—seeking better results with old plants [with discussion].** *Rec. [3rd] Conv. Brit. Wood Pres. Ass. 1953* [1954?] (72–94).

Recommendations include: selection of suitable schedules for the species to be preserved; use of the Lowry or a similar process for absorbent species and of higher temperatures for resistant species and some alterations to plant.

2966. Kuntz, E. E. Verfahren zum zonenweise verschiedenen Imprägnieren von Langholz und Einrichtung zur Ausübung des Verfahrens. **[Method of sectional impregnation of long logs with different preservatives and apparatus for applying it.]** *German Patent* No. 851,688, Oct. 6, 1952. pp. 5 + 10 dgms. [G.] P.O.

Long logs are pressure-impregnated so that their sections are impregnated in one operation with different liquids. The logs are arranged horizontally or obliquely, and special partitions incorporating a special flexible water-tight sleeve with a conical point ensure complete separation of the impregnating liquids.

2967. Purushotam, A., Sudan, S. K., and Sagar, V. **Preservative treatment of green Bamboos under low pneumatic pressures.** *Indian For.* 79 (12), 1953 (652–72 + 18 photos, 1 dgm.). 16 refs.

Describes a modified Boucherie method of impregnation, using 10–15 lb. pressure on the preservative contained in a closed vessel. Satisfactory absorption of $ZnCl_2$ was obtained with green *Bambusa polymorpha, B. nutans*, and *Dendrocalamus strictus*. Data are given on use of treated Bamboo.

2968. Baechler, R. H. **Effects of treating variables on absorption and distribution of chemicals in Pine posts treated by double diffusion.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (170–6). 3 refs.

Summarizes results of studies carried out at the U.S. Forest Products Laboratory since 1946 on the absorption and distribution of chemicals in Pine posts given double diffusion treatment by standing them upright in barrels. The effects of some variables—nature of the chemicals, strength of solutions, treating times, temperatures and species of wood—are discussed. Earlier work is reviewed.

2969. Lindgren, R. M. **Process of preserving wood.** *U.S. Patent* No. 2,643,957, June 30, 1953. pp. 4. P.O.

Trichoderma viride is cultured on green wood, the surface of which is coated with a thin layer of an inorganic fluoride, after which the resulting wood with an increased permeability is impregnated with a liquid preservative. [Cf. *For. Abstr.* 15 (No. 835).]

2970. Wagner, H. Die Nachimprägnierung von Bauholz durch das Pasten-, Bohrloch- und Bandagenverfahren. **[After-impregnation of building timber by the paste, bore-hole and dressing methods.]** *Bauhelfer, Berlin* 4 (14), 1949 (386–9). [G.] L.S.

General information, with particular reference to preservatives and methods used in Germany.

2971. Geiger. Die Holzschutzimpfung mit dem Springer-Presser. **[Inoculation of preservatives by means of the Springer-Presser appliance.]** *Bauhelfer, Berlin* 4 (14), 1949 (389–90). [G.] L.S.

Illustrated description of the appliance, virtually a kind of hypodermic syringe, consisting of a high-pressure container for the preservative (e.g. Wolmanit or Hydrasil) and a nozzle.

2972. Schulze, B. **Intensive protective treatment of standing Pine poles by impregnation in vats following high-frequency heating.** *Transl. For. Prod. Lab., Can.* No. 69, 1953. pp. 5. Transl. from *Elektrizitätswirtschaft* 50 (3), 1951 (66–8). [See *For. Abstr.* 14 (No. 2785).] Limited distribution. P.R.

2973. Smith, D. N. **Examination of a defective creosoted pole after treatment by the Cobra process.** *Timber Technol.* 61 (2174), 1953 (593–6).

Provisional results indicate that the treatment is effective when the decay occurs near the ground line.

2974. Swaay, H. van. Ontwikkeling van de houtbereiding in het bijzonder voor leidingmasten voor electriciteitsbedrijven. **[The development of timber treatment, especially for power transmission poles.]** *Electro-techniek, Den Haag* 31 (7), 1953 (113–4). [Du.e.] L.S.

Since 1925, poles have been treated by kyanizing the whole length followed by pressure creosoting of the lower part. In the last few years $MgCl_2$ has been replaced by the treatment with the more effective new Super-Wolman salt.

2975. Glaza, F. S., and Gooch, R. M. **No electrical hazard from pentachlorophenol.** *Electrical World, Albany, N.Y.* 139 (10), 1953 (88). D.S.I.R.

Experiments conducted since 1947 have shown that the treatment of cross-arms with pentachlorophenol does not affect their electrical properties, the moisture content being the most important factor in both treated and untreated cross-arms in determining resistance and flash-over voltage.

2976. Walters, C. S., and Meek, W. L. **Report on Project 301-A. Preservative treatment of fence posts by cold-soaking in pentachlorophenol fuel-oil solutions.** *For. Note Ill. agric. Exp. Sta.* No. 43, 1954. pp. 2 + 2 tbls.

A progress report.

2977. Société Nationale Des Chemins De Fer Français, and Ray, F. le. Procédé de conservation des bois et notamment des traverses de chemins de fer. **[Method of preserving wood, particularly railway sleepers.]** *French Patent* No. 977,248, March 29, 1951. pp. 2 + 2 dgms. [F.] P.O.

Wood is coated completely or partly with an impermeable bituminous layer, preferably on a

suitable primer which can be obtained by applying (1) a hydrocarbon binder and (2) a layer of gravel, rolled or rammed.

842. *Treatments to Improve the Resistance of Wood to Physical and Chemical Agencies other than Fire*

See also No. 2866.

2978. Austin, R. R. **Method of resin impregnating wood.** *U.S. Patent* No. 2,591,768, April 4, 1952. pp. 10. P.O.

Wood is impregnated to a certain depth with a monomeric, substantially solvent-free liquid, and coated soon after that with a liquid sealer, after which the wood is cooled and the monomeric resin cured by heat.

2979. Szöke, B. A bükkfa nemesítése préselés útján. **[Improving the properties of Beech wood by pressing.]** *Faipar, Hungary* 2 (10), 1952 (297–302). From *Hung. tech. Abstr.* 5 (4), 1953 (No. 47). C.B.D.S.

'Lignovit', an improved wood said to surpass 'Lignostone', is obtained from Beech by first heating it (moisture content not over 16%) to 150° C., compressing it to ½ its original volume, then cooling it while still in the press. The mechanical strength and hygroscopicity of the product have been tested. Its different uses are listed.

843. *Fireproofing and Fire Resistance*

See also No. 2826.

2980. Juda, W. (to Pyrotron Development Corporation). **Fire retardant.** *U.S. Patent* No. 2,616,866, Nov. 4, 1952. pp. 10. P.O.

The fire retardant is a substance selected from the group consisting of (1) a urea salt of a sulphonic acid of a monohydric phenol (hydroxy benzene and its monoalkyl substituted derivatives) and (2) the condensation polymer of an aldehyde with the salt referred to above, each neutralized with an inorganic volatile base.

2981. Eckert, L. W. (to Armstrong Cork Company). **Fire-resistant coating composition for fiberboard and the like.** *U.S. Patent* No. 2,632,743, March 24, 1953. pp. 8. P.O.

The composition is an aqueous dispersion of (1) $Ca(H_2PO_4)_2$ which is chemically stable in the dispersion, (2) 1–3 parts by weight of an amylaceous material (thin boiling starch, or the like) for each part of the unreacted $Ca(H_2PO_4)_2$ and (3) a dicyandiamide-aldehyde resin.

2982. O'Brien, H. C. **Method of flameproofing cellulosic wallboard and article produced thereby.** *U.S. Patent* No. 2,648,615, Aug. 11, 1953. pp. 6. P.O.

The board is impregnated with NH_4 sulphamate and $Na_2B_4O_7$ solution, the excess of water is removed, and the surface is coated with an organic sol of pyrobitumen.

2983. Yopes, P. F. **Fire-retarding paints and compounds for use on mine timbers.** *Coal Mining, Pittsburgh* 30 (5), 1953 (22–6). D.S.I.R.

Current method of applying fire-retardants are described and the different types of fire-retardant and their functions discussed. The results are summarized of an investigation conducted since 1949 by the Accident Prevention and Health Division of the U.S. Bureau of Mines on 16 different products or combinations of products, viz. 4 water-emulsion-type coatings, 1 oil-base coating, 2 mastic-base coatings and 9 oil-base and water-solution coatings. Two water-emulsion-type coatings have been found to be the most effective and relatively durable fire retardants; they contain synthetic resin and phosphate, and puff into a spongy mat when exposed to heat. They are recommended for most purposes in mines. The merits of other types of fire-retardant are also discussed.

2984. **Fire resistant coating for pit wood.** *Colliery Guardian, London* 186 (4816), 1953 (782). L.S.

To equal proportions of building sand and limestone dust a solution of Na silicate of sp. gr. 1·20 is added to form a smooth cream, applied by brush or spray. A thickness of $\frac{3}{16}$ in. meets normal heat tests.

844. *Attack by Plant Organisms*

2985. Hubert, E. E. **Aids in the isolation of fungi from woody tissues.** *Phytopathology* 43 (7), 1953 (403–4). 1 ref.

Describes a small metal 'C' clamp that holds infected wood, from which specimens are cut with a chisel forceps.

844.1. Sap-staining and Mould Fungi

2986. Brown, F. L. **Mercury-tolerant *Penicillia* causing discoloration in Northern White Pine lumber.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (67–9). 12 refs. [College of Forestry, State University of New York, Syracuse 10.]

Two fungi isolated from timber treated with Hg compounds were shown to be the cause of a deeply penetrating blue discoloration of *Pinus strobus* sapwood. These fungi, *Penicillium cyclopium* and *P. crustosum* were found to be several times more tolerant of Hg than *Ophiostoma coeruleum.* The fungi caused no significant decrease in toughness of discoloured specimens and seemed to destroy only epithelial tisue.

2987. Liese, W., and Hartmann-Fahnenbrock, M. Elektronenmikroskopische Untersuchungen an verblautem Kiefernholz. **[Electron-microscope investigations of blue-stained Pine.]** *Holzforschung, Berlin* 7 (4), 1953 (97–102 + 11 photos). 22 refs. [G.g.e.] P.R.

Presents results of research on wood with natural blue-stain and one specimen artificially stained with *Scopularia phycomyces.* The hyphae grow mainly in the lumina of longitudinal tracheids and pass from one cell to another through bordered pits, penetrating directly through the torus. Hyphae were sometimes found inside the middle lamella.

2988. Schulz, G. Bläueschutz bei Kiefern-Stamm- und Schnittholz. **[Protection against blue-stain in round and converted Pine.]** *Holz-Zbl.* 79 (29), 1953 (319–21). 24 refs. [G.]

Presents tabulated results of tests on prevention of blue stain by immersion in, or spraying or brushing with, preservatives (Na pentachlorophenate and 3 proprietary preservatives). Though these measures give satisfactory results with converted wood, even a very high concentration of preservative was often found ineffective for logs, where the main factor is the virtual impossibility of treating them immediately after felling.

844.2. Wood-destroying Fungi

See also Nos. 2268, 2624–38, 2865, 2934, 2949, 3010.

2989. Saho, H. **[The measurement of decay by boring tests on Sugi test pieces.]** *J. Jap. For. Soc.* 35 (11), 1953 (359–63). 7 refs. [Jap.jap.e.]

[Cf. *For. Abstr.* 14 (Nos. 2811–2).] Samples of *Cryptomeria japonica* exposed to cultures of *Trametes albida* and *Lenzites trabea* showed slight discoloration after 2 and considerable discoloration after 3 months. After 5 months the oven-dry weight of heartwood (h.w.) and sapwood (s.w.) decayed by *T. albida* had decreased to 93 and 89% respectively and that of h.w. and s.w. decayed by *L. trabea* to 85 and 91%. In torque-energy tests, the amount of specific torque-energy required to bore pieces decayed by *T. albida* had decreased to 83% (h.w.) and 68% (s.w.), and for those decayed by *L. trabea* to 78 and 71%. Since an almost linear relationship was found between % decrease in oven-dry weight and specific torque-energy needed, the boring method is considered sufficiently accurate for determining the degree of decay. [Results are shown in tables and figures with English text.] *From author's summary.*

2990. Matters, C. N., Costa, E. W. B. da, and Tamblyn, N. **Project P.11: The characteristics of Australian decay and stain fungi. Sub-project P.11-12: The identification of basidiomycete fungi in culture. Progress report No. 3. Morphological characters of *Polyporus australiensis* Wakefield, *P. colensoi* Berk., *P. tumulosus* Cke., and *Schizophyllum commune* Fr.** Division of Forest Products, C.S.I.R.O., Melbourne. 1953. pp. 18 + 4 photos + 5 tbls. 4 refs. Limited distribution.

2991. Matters, C. N. **Project P.11: The characteristics of Australian decay and stain fungi. Sub-project P.11-12. The identification of basidiomycete fungi in culture. Progress report No. 4. Morphological characteristics of 9 isolates of *Trametes lilacino-gilva* Berk.** Division of Forest Products, C.S.I.R.O., Melbourne. [1953?]. pp. 11 + 3 photos + 5 tbls. Limited distribution.

2992. Jacquiot, C., and Leaubie, M. Nouvelles expériences relatives à l'action de la conservation sous l'huile minérale sur l'activité de quelques espèces de champignons lignicoles. **[Some new results relating to the effect of preservation in mineral oil on the activity of some species of wood-destroying fungi.]** *Rev. Mycol., Paris* 17 (2), 1952 (168–70). 3 refs. [F.] I.M.I.

[Cf. *For. Abstr.* 14 (Nos. 774–5).] Results of tests on the relative destructive power of cultures of 10 fungi preserved for 6–7 months (1) in mineral oil or (2) by successive cultures are tabulated. Oak, Beech, Scots Pine, Poplar and *Prunus avium* were subjected to attack. Five fungi (all the white-rot fungi tested and 1 cubical-rot fungus, *Lenzites quercina*) showed an increased power of destruction when preserved in oil; the two other cubical-rot fungi (*Trametes trabea* and *Poria vaillantii*) and *Fomes pini* showed reduced power of destruction; results for *Pholiota aegerita* and *Pleurotus serotina* were inconclusive.

2993. Siu, R. G. H., and Reese, E. T. **Decomposition of cellulose by microorganisms.** *Bot. Rev.* 19 (7), 1953 (377–416). Numerous refs.

A comprehensive review of research in this field, with bibliography.

2994. Higuchi, T. **[Carbohydrate metabolism of wood-destroying fungi.]** *J. Jap. For. Soc.* 35 (11), 1953 (339–49). 65 refs. [Jap.]

A review of literature.

2995. Higuchi, T. **Biochemical study of wood-rotting fungi: (I) Studies on the enzymes which cause Bavendamm's reaction.** *J. Jap. For. Soc.* 35 (3), 1953 (77–85). 24 refs. [E.jap.]

Cf. *For. Abstr.* 14 (No. 1653).

2996. Higuchi, T., and Kitamura, K. **[Biochemical study of wood-rotting fungi: (II) Relation between Bavendamm's reaction and tyrosinase.]** *J. Jap. For. Soc.* 35 (11), 1953 (350–4), 16 refs. [Jap.jap.e.]

2997. Higuchi, T. **[Biochemical study of wood-rotting fungi (III). *In vitro* experiment on Bavendamm's reaction using α-naphthol re-agent.]** *J. Jap. For. Soc.* 36 (1), 1954 (22–4). 4 refs. [Jap.jap.e.]

2998. MacLean, H., and Gardner, J. A. F. **Some chemical and plastic properties of Western Red Cedar butt rot.** *J. For. Prod. Res. Soc.* 3 (4), 1953 (35–7, 72). 9 refs. [Vancouver Forest Products Laboratory.]

In laboratory tests cubical butt rot, believed to result mainly from the action of *Poria asiatica*, from Western Red Cedar was used instead of Walnut-shell flour as a filler in plywood glues, and its alkali-soluble portion instead of part of the phenol-formaldehyde. The butt rot was found to act as an extender, and to increase glue line strength. Its use, however, caused troublesome high viscosities in the resin mixture, attempts to reduce which were unsuccessful. Chemical studies suggested that the butt rot was an isolated lignin and that its high alkali solubility and reactivity were due to its high content of phenolic OH groups. The alkali-soluble portion, substituted directly for 50% of the phenol-formaldehyde resin normally used, gave glues equal in strength, viscosity and durability to the two commercial glues tested. [Cf. *For. Abstr.* 13 (No. 4389).]

2999. Hamaguchi, T. **[The relation between the season of felling Bamboo and its decay.]** *J. Jap. For. Soc.* 35 (3), 1953 (85–7). 6 refs. [Jap.jap.e.]

Samples from 3 *Phyllostachys* spp. cut at monthly intervals were inoculated with 2 fungus species and kept for 100 days. *P. reticulata* lost least weight, followed in order by *P. pubescens* and *P. nigra* var.

henonis. Loss of weight was lowest for samples cut between September and February. *From author's summary.*

3000. Jagielski, A. Porównanie naturalnej odporności drewna grochodrzewu, dębu i sosny na rozwój grzybni. **[Comparison of the natural resistance of the woods of Robinia, Oak, and Pine to fungus attack.]** *Prace Inst. Bad. Leśn.* No. 95, 1953 (40–57). 8 refs. [Pol.pol.russ.e.]

Tests with blocks of Robinia, Oak and Pine (in accordance with the standard DIN-DVM 2176) and the fungi *Coniophora cerebella*, *Polystictus versicolor* and *Merulius lacrymans*, have shown that heartwood of Robinia is almost as resistant as Oak heartwood and considerably more resistant than Pine sapwood.

3001. Barlai, E. A hárosi falemezmüvekben végzett rönkvédelmi kutatás ismertetése. **[Researches on the protection of logs.]** *Faipar, Hungary* 2 (12), 1952 (355–63). From *Hung. tech. Abstr.* 5 (4), 1953 (No. 46). C.B.D.S.

The various methods of protection are enumerated; application (to start in May) of NaF solution to the butt end, followed by bituminous dressing, and water storage are considered the two most effective for Hungary.

3002. Björkman, E. **The occurrence and significance of storage decay in Birch and Aspen wood with special reference to experimental preventive measures.** *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953 (53–90). 15 refs. [E.e.sw.]

In experiments on forest storage between 1947 and 1951, completely barked Birch and Aspen pulpwood showed comparatively little decay over a 2–3 year period, that barked in strips and stored in an open position dried reasonably well without much decay, and unbarked pulpwood, especially Birch, showed substantial damage to a maximum of ½ m. from the ends within the first 2 years. Strip-barked pulpwood stored in the mill yard also dried well, without much decay. Eight main fungi, all of the white-rot type, were found to cause decay. Experimental cooking of decayed Birch showed that the amount of decay after storage for one year had little effect on yields or quality but that wood that had been stored 2 and 3 years showed decreases of 5 and 10–20% respectively, with reduced pulp strength but little reduction in brightness. Yields of rayon pulp from Aspen after 2–3 years' storage were also reduced but to a smaller extent. Laboratory experiments on treated Aspen blocks showed that decay was prevented by chlorophenols, chlorated naphthalenes, fluorine salts and tars as long as the blocks were not subjected to leaching; leaching was reduced by the use of Modocoll (ethyl-oxiethyl cellulose) in combination with some of the preservatives. In timber-yard experiments with Aspen matchwood, spraying with chemical agents reduced the volume of decayed sapwood, and preliminary experiments on brush applications to the log ends immediately after felling have given still better results.

3003. Batty, H., and Lange, W. Verfahren und Vorrichtung zur Bekämpfung von tierischen und pflanzlichen Holzschädlingen. **[Method and apparatus for controlling animal and plant pests of wood.]** *German Patent* No. 855,331, Nov. 13, 1952. pp. 2 + 4 dgms. [G.] P.O.

Wood, brickwork etc. are treated with R.F. or ultra-high-frequency radiation, the electrodes being equipped with electric reflection devices.

3004. Theden, G. Erfahrungen über holzzerstörende Pilze in Berlin. **[Experience with wood-destroying fungi in Berlin.]** *Schädlingsbekämpfung, Hamburg* 44 (5), 1952 (77–80). [G.] I.I.E.

Discusses the material obtained from the statistics of 712 identifications of 'house fungi', made by the Materialprüfungsamt Berlin-Dahlem in 1945–52: the species involved, their occurrence in different parts of houses, and the probable causes of increased fungal attack.

3005. Les champignons des maisons. **[Fungi occurring in houses.]** *Ann. Éc. Eaux For., Nancy* 13 (2), 1953 (455–66 + 1 plate). [F.f.g.e.]

Revision of a bulletin, first published in 1929 and now brought up to date, on the prevention and control of *Merulius lacrymans* and *Poria vaporaria* in houses.

845. *Attack by Animals*

845.1. Marine Borers

3006. **Gunite for pile protection.** *Constructional Review, Sydney* 25 (5), 1952 (21—3). D.S.I.R.

Describes the guniting (coating with a 1½- to 2-in. layer of reinforced concrete) of *Eucalyptus marginata* piles in the port of Bunbury, Western Australia.

845.2. Terrestrial Borers

See also Nos. 2696, 2949, 3003, 3090.

3007. White, M. G. **The house longhorn beetle *Hylotrupes bajulus* L. (Col. Cerambycidae) in Great Britain.** *Forestry* 27 (1), 1954 (31–40). 16 refs.

Records of infestation known to the Forest Products Research Laboratory since 1934 are summarized according to locality and type, the great majority being from Surrey. Attack in buildings may be of long standing and extinct, or of more recent origin and usually active. Out of doors, living insects have been found in habitats ranging from dead parts of a standing Douglas Fir to a stack of sawn Scots Pine. Active attack in packing cases and crates of various origins has been recorded from different parts of the country. The possibility of spread of infestation is discussed and its effect examined in relation to the quality and dimensions of roofing timbers in modern buildings. *From author's summary.*

3008. Edwards, J. P. **Control of ambrosia beetles.** *Rep. For. Adm. Malaya 1952*, 1953 (14).

Tests were made of a commercial preparation containing γBHC in a creosote derivative. The test material was protected for 3 weeks, after which it became more heavily infested than untreated controls. This is believed to be due to the leaching out of the γBHC by rain, after which the effect of the creosote derivative was to make the timber more than normally attractive.

3009. Brimblecombe, A. R. **The prevention of borer attacks on Hoop Pine logs.** *Qd. J. agric. Sci.* 8 (4), 1951 (69–105). 13 refs. O.R.E.

Investigations were begun in the Killarney district in 1939 and continued over several years to find means of protecting *Araucaria cunninghamii* logs in the forest from borers. The beetles responsible there are 5 species of Platypodidae and 2 of Scolytidae. Of these, *Platypus froggatti* is the largest and most destructive and specific to *A. cunninghamii*; the other species are polyphagous. Information is presented on the appearance and habits of the borers. In the experiments a variety of chemicals, including creosotes, were tested (sprays). All the treatments reduced borer attack, but the non-creosote treatments were significantly inferior to creosote. Materials mixed with creosote did not add to its value. Creosote at the rate of 1 gal./140 sq. ft. log surface gave practically complete protection for 10 weeks.

3010. Becker, G. Über Holzschutz in Gebäuden und einige seiner Anwendungsschwierigkeiten. **[Wood preservation in buildings and some difficulties in its application.]** *Schädlingsbekämpfung, Hamburg* 44 (5), 1952 (80–3). 1 ref. [G.] I.I.E.

Discusses the problem of the proportion of oily insecticides to be used for securing adequate insect kills, the need for a second treatment when the timber has dried out in the building, and some particulars of fungus control in building timbers and brickwork.

845.3. Termites

3011. Harris, W. V. **Termites and tropical agriculture.** *Trop. Agriculture, Trin.* 31 (1), 1954 (11–8). 4 refs.

Types of termite, the damage they do to farm buildings and crops and their influence on soil fertility.

847. *Drying* (*Seasoning*)

See also Nos. 2894, 2939.

3012. Baker, W. J. **How wood dries. Information reviewed and reaffirmed.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1642, 1951. pp. 8. P.R.

Cf. *For. Abstr.* 9 (No. 1753).

3013. Baker, W. J. **Drying stresses in lumber seasoning. Information reviewed and reaffirmed.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1652, 1950. pp. 8 + 1 gph. P.R.

Cf. *For. Abstr.* 10 (No. 548).

3014. Clausen, V. H. **Air seasoning of California Redwood.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (185–8). 3 refs.

Tests on *Sequoia sempervirens* allowed to air-dry before kiln-drying showed that the narrow space between piles normally used is inefficient, especially for 'sinker' timber (that with m.c. over 150% when sawn) which forms about 70% of the total. A spacing of 6–8 ft. was found to be the most economical as regards drying speed and yard area needed. An equation is given for the point at which air drying becomes more costly than kiln drying. For 1-in. sinker timber dried with an 8-ft. spacing this point was at 55% m.c.

3015. Pallay, N. Az 1950. és 1951. évi tüzifa súlyapadási vizsgálatok eredményeinek összefoglalása. **[Summary of results of investigations into loss of weight in firewood in 1950 and 1951.]** *Erdö* 1 (2), 1952 (121–30, 162–3, 166–7). [Hung.russ.g.]

Presents and discusses, with graphs, preliminary results for hard and soft broadleaved, and for Scots Pine firewood, separately for thick, medium and small wood. A fuller and final report covering 3 years' work is promised.

3016. Pratt, W. E. **Some applications of statistical quality control to the drying of lumber.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (28–31, 212, 214). 3 refs.

Discusses the construction and use of control charts and of frequency distribution and cumulative frequency curves. [Cf. *For. Abstr.* 15 (Nos. 2926, 2938, 3064).]

3017. **Table of relative humidity and equilibrium moisture content for dry- and wet-bulb hygrometer.** *Tech. Note U.S. For. Prod. Lab., Madison* No. 156 (rev.) 1952. pp. 3. P.R.

3018. Loughborough, W. K. **Need for uniformity of temperature in a dry kiln. Information reviewed and reaffirmed.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1669, 1951. pp. 6 + 1 tbl. P.R.

3019. Fleischer, H. O. **Drying rates of thin sections of wood at high temperatures.** *Bull. Yale Sch. For.* No. 59, 1953. pp. 86 + 3 plates. 39 refs.

Thin sections of wood of several species were dried in air at temperatures up to 350° F. and at several levels of humidity and air velocity. Drying rates for specimens $\frac{1}{4}$ in. thick were found to follow closely the trends predicted by water-diffusion equations based on the Fourier heat-conduction law. Thinner specimens departed from these trends, particularly when dried at temperatures above 212°, apparently because diffusion of water did not govern the drying.

The surface coefficient of heat transfer to the drying specimens was found to vary directly, in geometric ratio, with moisture content during drying. This resulted in a simple arithmetic relationship between the drying rate and drying time, which can be integrated to determine the moisture content at any time during the drying cycle. The slope of the line representing the relationship called 's', is a measure of the rate of drying. It was found to vary significantly, within the range of conditions normally used in drying thin wood, with temperature, air velocity, and thickness.

The existence of a temperature and moisture gradient during the early part of the drying cycle did not invalidate the conclusion that moisture diffusion was not a governing factor in determining the drying time. *Author's summary.*

3020. Kollmann, F. **Investigations of the drying of sawn Pine timber at elevated temperatures.** *Transl. Commonw. sci. industr. Res. Organ. Aust.* No. 1812, 1953. pp. 55 + 9 photos + 9 dgms. + 47 gphs. + 7 tbls. 34 refs. Transl. by M. Slade from *Medd. svenska TräforsknInst.* (*Trätekn. Avd.*) No. 23, 1952. [See *For. Abstr.* 14 (No. 1682).] Limited distribution. P.R.

3021. Czepek, E. Die Holztrocknung bei Temperaturen über 100° C. **[Wood seasoning at temperatures above 100° C.]** *Allgemeine Wärmetechnik, Dissen* 4 (3), 1953 (54–9). 5 refs. [G.] L.S.

Technological and economic analysis of its merits.

3022. Arend, A. G. **Recent developments in timber seasoning. Heat energy stored in timber utilised to finish-off seasoning process.** *Woodwkg. Ind.* 11 (1), 1954 (39–40). P.R.

Includes a brief account of a device for automatic cutting of heat supply to high-temperature kilns, so as to utilize for the final seasoning the heat stored in the wood itself.

3023. McMillen, J. M. **Kiln drying Water and Swamp Tupelo.** *J. For. Prod. Res. Soc.* 3 (5), 1953 (189–96).

Results of seasoning tests on sample boards of different thicknesses of *Nyssa aquatica* and *N. sylvatica* var. *biflora* indicate that timber of the two species should be segregated and that sapwood should be segregated from heartwood. Where this is impossible, the schedule recommended for *N. aquatica* should be used, and a large number of kiln samples prepared for each charge, conditions in the kiln being adjusted in relation to the average moisture content of the wettest of the samples. Warping, case-hardening and final m.c. are discussed.

3024. **Economical lumber drier for small plants. Hildebrand small drier—HD 74.** *Transl. For. Prod. Lab., Can.* No. 65, 1953. pp. 2. Transl. by E. Perem from *Holz Roh- u. Werkstoff* 11 (4), 1953 (166–7). [*For. Abstr.* 14 (No. 3916).] Limited distribution. P.R.

3025. Rasmussen, E. F. **Steam heating systems in lumber dry kilns.** *Rep. U.S. For. Prod. Lab., Madison* No. *D*1945, 1953. pp. 7. P.R.

3026. MacLean, H., and Gardener, J. A. F. **Aluminum sheet linings for wooden kilns.** *Lumberm.* 80 (13), 1953 (100). 2 refs.

In a wooden kiln badly damaged by the acid condensate from *Tsuga heterophylla* during seasoning [cf. *For. Abstr.* 13 (No. 3446)], new sections of *Thuja plicata* lined with aluminium sheeting were introduced into the walls. Corrosion of the wood when the panels were removed after more than year was negligible.

3027. Gustafsson, N.-E. Puutavarakuivaamoiden palontorjunta. **[Fire prevention in timber drying kilns.]** *Pap. ja Puu* 36 (2), 1954 (47–57). [Fi.e.] P.R.

Discusses the use of fire doors, of sprinklers and of fine spray systems in limiting spread of fire.

3028. **Special methods of seasoning wood. Vapor drying.** *Rep. U.S. For. Prod. Lab., Madison* No. 1665–3 (rev.) 1953. pp. 4. 13 refs. P.R.

A description of the method and discussion of its merits, with a review of the literature.

3029. Elwood, E. L., Gottstein, J. W., Kauman, W. G., and Wright, G. W. **Vapour drying: a summary of research studies.** *Aust. For.* 17 (1), 1953 (9–16 + 5 plates).

Laboratory studies of the suitability of the vapour-drying process for Australian timbers are described. The work covers the seasoning of both pervious and impervious timbers of joinery and furniture quality, as well as the partial drying of large-section material required to be given preservative treatment. The influence of a number of process variables, including working fluid, working pressure, and wood temperature, was examined. The study showed that the basic process can be modified to give good-quality drying with both pervious and most impervious species, in thicknesses at least up to 1 in. Considerably accelerated drying rates were obtained compared with those usual in orthodox internal-fan drying kilns. With refractory species a reduction in drying time to about 30% of kiln times was obtained, whereas for pervious timbers of the Pine type drying times were reduced to some 5–10% of kiln times. The studies also indicated that for the successful commercial vapour drying of timber of joinery quality, further consideration would need to be given to means for overcoming several engineering and process difficulties. *Authors' summary.*

3030. Narayanamurti, D., and Prasad, B. N. **A small infra-red dryer.** *Comp. Wood* 1 (1), 1953 (6–7). 1 ref. P.R.

Illustrated description of a small rotating infra-red dryer for match-sticks, with double plywood walls lined with aluminium foil and infra-red lamps. Presents provisional results of drying $\frac{1}{16}$-in. splints of 14 species.

3031. Wingard, R. E., and Searcy, C. N. **Infra-red drying studies: sand and Pine lumber.** *Engineering Bulletin, Engineering Experiment Station, Auburn, Alabama* No. 19, 1953. pp. 19 + 13 gphs. + tbls. 12 refs.

Tests were made with infra-red drying of several grades of sand and standard rough Pine [unspecified] boards. The cost of drying lumber by infra-red was found to be ca. $100·00/1000 bd. ft. compared with $6·00 in a small steam-heated kiln. Respective drying times were 10 hr. and 96–100 hr.

3032. Trégis, L.-A.-J. **Lumber seasoning process.** *Transl. For. Prod. Lab., Can.* No. 66, 1953. pp. 3. Transl. from *French Patent* No. 1,001,957, Feb. 29, 1952. [See *For. Abstr.* 14 (No. 3919).] Limited distribution. P.R.

848. *Timberyard Practice. Handling and Storage of Timber*

See Nos. 2939, 3001–2.

85. GRADING OF WOOD AND WOOD PRODUCTS

852. *Detection, Recognition and Assessment of Injuries and Defects*

See also Nos. 2597–8, 2825, 2891–2, 2908, 2939.

3033. Limaye, V. D. **Interlocking of grain in Indian timbers.** *Indian For.* 80 (1), 1954 (6–9 + 8 photos).

Interlocking of grain to a smaller or greater extent is a characteristic of a majority of Indian wood species. An attempt is made in this article to measure the deviation of grain and divide the species into 7 groups as a step towards standardization of

descriptions of wood species. *From author's summary.*

3034. PILLOW, M. Y. **Effects of tension wood in hardwood lumber and veneer.** *Rep. U.S. For. Prod. Lab., Madison* No. *R*1943, 1953. pp. 6 + 8 photos. 4 refs. P.R.

A full, official version of the paper abstracted in *For. Abstr.* 14 (No. 811).

3035. YRJÖNEN, E. Havaintoja tukeissa ja sahajätteen joukossa esiintyvien metallikappaleitten vaikutuksesta ja torjunnasta. **[Observations on the effect of and measures to detect foreign metallic bodies in logs and sawmill waste.]** *Pap. ja Puu* 36 (1), 1954 (11–4). [Fi.e.] P.R.

Observations by a sawmilling company have shown that foreign bodies in the logs have been the cause in one-third of the cases where frame saws have been stopped during sawing. Pieces of metal are found on an average once in every shift in each set of frame saws, and cause a 3% loss on the whole working time. A detector of electromagnetic type has been successfully used to eliminate metal from sawmill waste for the chipper, and costs have thereby been reduced by 400,000–500,000 Finnish Marks per chipper annually. [Cf. *For. Abstr.* 11 (No. 2818).]

3036. SANDERMANN, W., and LÜTHGENS, M. Untersuchungen über Verfärbungen von Hölzern. **[Investigation of wood discoloration.]** *Holz Roh- u. Werkstoff* 11 (11), 1953 (435–40). 17 refs. [G.g.] P.R.

Presents the results of tests on the effect of time, temperature, Fe concentration and pH on the discoloration of wood due to the reaction between Fe and tannins (also phenols). Pairs of curves showing the relationship between discoloration (measured photometrically) and pH for 2 concentrations of Fe permit some conclusions to be drawn for the reaction of woods under certain conditions. The investigation also includes test on discoloration of lacquered and untreated wood, under irradiation with light. Infra-red does not affect untreated wood. Ultra-violet causes darkening in wood of a number of European and tropical species within a few days. Walnut, however, is bleached. Phenol-formaldehyde-base lacquers are readily, and urea-formaldehyde-base lacquers very little darkened.

853. *Grading of Wood in the Rough*

3037. OSTRANDER, M. D., and ENGLERTH, G. H. **Hardwood log grading scale stick improved.** *For. Res. Note Ntheast. For. Exp. Sta.* No. 24, 1953. pp.2.

Describes modifications to the scaling stick already described [see *For. Abstr.* 13 (No. 4368)].

86. PULP INDUSTRIES. COMPOSITE MATERIALS MADE WHOLLY OR PARTLY OF WOODY MATTER. CHEMICAL UTILIZATION OF WOOD

See also section 813.

3038. STAMM, A. J., and HARRIS, E. E. **Chemical processing of wood.** Chemical Publishing Co., New York. 1953. pp. x + 595. 1391 refs. Price $12·00. P.R.

Includes sections on the constituents, structure, surface properties, and mechanical and thermal properties of wood; on wood drying; wood preservation and improvement; wood-base plastics and boards; pulp and paper; tree exudates; distillation of wood; extractives; wood hydrolysis, and hydrogenation of wood.

3039. PROSIŃSKI, S., and SIWEK, K. Prace Zakładu Chemicznego Przerobu Drewna. **[Research in the Section of Chemical Processing of Wood.]** *Sylwan* 97 (6), 1953 (442–5). [Pol.]

The Section, previously forming part of the Forest Research Institute, Warsaw, was transferred late in 1952 to Poznań as one of the sections of the newly founded Institute of Wood Technology. The main subjects of research are: destructive distillation of wood, distillation and processing of oleoresin, extraction of resin from stumpwood, and chemical utilization of woodwaste. Most progress has been made in the research on stumpwood, viz. the effect of degree of comminution, duration of extraction and moisture content on the extraction yield. Provisional results are graphed.

861. *Pulp and Paper Manufacture. Textile and Other Cellulose Derivatives*

See also Nos. 2807, 3002, 3070, 3081.

3040. PECHOUTRE, M. L'exploitation forestière d'une usine de pâtes à papier sous les tropiques. **[The organization of forest operations for supplying a pulp mill in the tropics.]** *Rev. int. Prod. colon.* 28 (291), 1953 (229–31, 238). [F.]

Describes the organization of felling operations and labour, equipment etc. for supplying a pulp mill in the Ivory Coast, and draws conclusions for tropical conditions generally.

3041. **The production of cellulose pulp from British Commonwealth raw materials: a report from the Natural Resources (Technical) Committee Working Party on Pulp Production.** *Colon. Plant Anim. Prod.* 3 (4), 1953 (331–41). 9 refs.

3042. HEBBS, L. G. S. **An approach to the problem of increasing cellulose supplies [with discussion].** *Repr.* from *Proceedings of the Technical Section of the British Paper and Board Makers' Association (Incorporated)* [, *London*] 33 (2), 1952 (277–304, 371–82).

Discusses supplies of softwoods, hardwoods and other fibrous materials and includes data on properties of pulps from different materials including hardwoods from British Guiana, Bamboos, reeds and grasses, *Eucalyptus* spp. and *Pinus* spp.

3043. BHAT, R. V., and NARENDRA, S. J. **Indigenous cellulosic raw materials for the production of pulp, paper and board. Part XVII. Writing and printing papers from castor stems [*Ricinus communis* Linn.].** *Indian For.* 79 (12), 1953 (646–51 + 2 specimen sheets).

Pilot-plant experiments produced short-fibred but satisfactory sulphate pulps. The admixture of 30% Bamboo pulp provided good writing and printing papers.

3044. Spearin, W. E., and Dressler, R. C. **Stain technique for differentiating hardwood and softwood mechanical pulps.** *Tappi* 37 (1), 1954 (39–42). 6 refs. P.R.

Using appropriate weight factors and an empirical correction, it is possible, with the Mäule stain reaction, to estimate either of the components of the mechanical pulp mixture within ± 5%.

3045. MacLaurin, D. J., and Peckham, J. R. **Semichemical pulping of Southern Red Oak (*Quercus rubra*).** *Tappi* 36 (12), 1953 (557–60). 2 refs. P.R.

3046. Lengyel, P. Lombos fák telhasználása a papíriparban. **[Utilization of hardwoods in the paper industry.]** *Papír- és Nyomdatechnika, Budapest* 4 (6/7), 1952 (46–52). 13 dgms. and gphs. From *Hung.tech. Abstr* 5 (2), 1953 (No. 93). C.B.D.S.

Tests have shown that hardwoods should be cooked to semichemical pulp or at least to part-digested chemical pulp. Beech, Poplar (white and Lombardy), Birch and Willow have been compared with Pine and the applicability of different pulping processes examined. The neutral semichemical sulphite and the kraft processes retain a larger % of pentosans in the pulp; for Poplar the strength properties of these pulps is increased owing to the fibre-to-fibre bonding by pentosans.

3047. MacLaurin, D. J., Peckham, J. R., and Weber, W. B. **A comparison of kraft and neutral sulphite semichemical pulps from Birch and Maple.** *Tappi* 36 (12), 1953 (553–7). 1 ref. P.R.

Birch (*Betula lutea* with *B. papyrifera*) has been found to be more difficult to pulp but has given a higher yield of stronger pulp than Maple (*Acer saccharum* with *A. saccharinum*).

3048. Husband, R. M. **Semichemical and high-yield chemical pulping of hardwoods with Na_2SO_3 and $NaHSO_3$.** *Tappi* 36 (12), 1953 (529–34). 19 refs. P.R.

It has been found that 70–80% yields of semichemical pulps with improved strength properties can be prepared from *Betula papyrifera* and *Acer saccharum*, using 10% or less of Na_2SO_3 as the sole chemical agent. A 55% yield of chemical pulp with good strength properties was obtained from *B. papyrifera* chips digested with $NaHSO_3$ equivalent to 14·1% of Na_2CO_3 and 8·5% of S.

3049. Vyas, G. M. **Hardwood as raw material for viscose pulps.** *J. sci. industr. Res. India* 12*B* (8), 1953 (366–72). 24 refs. D.S.I.R.

Presents results of investigations on the preparation and purification of viscose-grade pulps from *Betula papyrifera*. The chemical composition of pulps obtained is comparable to that of commercial softwood viscose pulps except for a higher pentosan content.

3050. Kleinert, T. N., and Wurm, P. Sulfitzellstoffe aus Buchenrinde und ihr Verhalten im Viskoseprozess. **[Sulphite pulp from Beech bark and its behaviour in the viscose process.]** *Svensk Papp-Tidn.* 57 (1), 1954 (19–22). 22 refs. [G.g.] P.R.

Pulping tests on Beech bark showed that it was only partly dissolved in the viscose process. It is therefore important that for textile pulps wood should be thoroughly barked or that the pulp should be cleaned. Data on the chemical composition of the bark and of the bark pulp are given.

3051. Prey, V., Waldmann, E., and Krzandalsky, W. Zur Kenntnis des alkalischen Aufschlusses von Buchenholz. **[Alkaline pulping of Beech.]** *Holzforschung, Berlin* 7 (4), 1953 (117–22). 13 refs. [G.g.e.] P.R.

During the digestion of Beech, 75% of the alkali consumption (12% of weight of wood) by hemicelluloses is used for neutralizing acids formed during its digestion. It is probable that a part of technical alkali lignins is also formed from hemicellulose then.

3052. Hata, K., and Sogo, M. **[Studies on the pulp of 'Akamatsu' (*Pinus densiflora*) wood. XIX. Difficulties in sulphite pulping of the heartwood.]** *J. Jap. For. Soc.* 34 (12), 1953 (386–90). 4 refs. [Jap.jap.e.]

[Cf. *For. Abstr.* 14 (No. 3941).] Heartwood extracted with different organic solvents still proved difficult to pulp, but the rate of delignification was nearer that of sapwood with Na_2SO_3 liquor (pH about 9·8) than with Kullgren liquor (pH 6), and heartwood sulphonated with Na_2SO_3 was subsequently more readily delignified with acetic-acid liquor (pH 2·2) than that sulphonated with Kullgren liquor. Less phloroglucinol combined with extracted heartwood than with sapwood. Pinosylvin phenols were separated from the ether extract of the extracted heartwood. These results confirm the theory that some of the phenolic substances in the heartwood are combined with the lignin in wood. *From authors' summary.*

3053. Hauan, S. Laboratoriedefibrering av sagflis og kutterflis. **[Laboratory defiberizing of sawdust and shavings.]** *Norsk Skogind.* 7 (6), 1953 (192–7). 1 ref. [Nor.e.] P.R.

Chips of different dimensions were defiberized, with or without the addition of lime or NaOH, and tests were made on their paper-making properties. The largest chips (i.e. those with the longest fibres) gave the best results. The addition of either lime or NaOH, but especially of lime, increased the strength properties obtained.

862. *Composite Materials made Wholly or Partly of Woody Matter*

See also Nos. 2896, 2981–2.

3054. Stegmann, G. Entwicklung und Herstellung von Holzspanplatten. **[Development and manufacture of wood chipboards.]** *Holz-Zbl.* 80 (23), 1954 (297–8). [G.]

Summary of the conference of the 'wood utilization (improvement)' section of the Deutsche Gesellschaft für Holzforschung (11 Feb. 1954, Brunswick), including papers on: reduction of swelling; chipboards resistant to fungi and termites; fireproof chipboards, and Japanese experience in chipboard manufacture.

3055. Va. Die Holzspanplatte—ein neuer Werkstoff. **[Wood chipboard, a new material.]** *Holz-Zbl.* 79 (152), 1953 (1621 . . . 1624). [G.]

A general account dealing with: raw material and production of boards, and their properties, storage

and use. The following data are tabulated for 13 German-made chipboards: dimensions and thickness, density, surface appearance, bending strength, and use.

3056. KOLLMANN, F. **Manufacture of medium-density wood-chip boards by the dry process**. *Transl. Commonw. sci. industr. Res. Organ. Aust.* No. 1855 [*n.d.*]. pp. 26 + 12 photos + 24 dgms. + 1 gph. 11 refs. Transl. by M. Slade from *Holz Roh- u. Werkstoff* 10 (4), 1952 (121–34). [See *For. Abstr.* 13 (No. 4388).] Limited distribution. P.R.

3057. HARRIS, G. M. (One-half to H. A. Cook.) **Composition of matter for making artificial lumber**. *U.S. Patent* No.2,609,303, Sept. 2, 1952. pp. 2. P.O.

Ca. 128 parts [by weight?] of comminuted wood (sawdust etc.), ca. 12 parts of 40% formaldehyde solution, ca. 1–2 parts H_2SO_4 and ca. 16 parts starch.

3058. PATTON, E. A. **Ponderosa Pine woodwork residues for dry formed particle board**. *J. For. Prod. Res. Soc.* 3 (5), 1953 (146–7).

An account of the manufacture and properties of 'Prespine'. [Cf. *For. Abstr.* 11 (No. 1304).]

3059. MILLER, H. C. L. **Chipcore—its characteristics and production**. *J. For. Prod. Res. Soc.* 3 (5), 1953 (149–52).

Tests were made on Chipcore, defined for this paper as a relatively thick ($\frac{3}{8}$- to $1\frac{1}{4}$-in.) panel produced by curing a suitably selected and prepared mixture of wood particles and binder under conditions of heat and pressure permitting the polymerization of the binder and the formation of a panel with suitable properties for its intended use. A variety of hardwood and softwood species was used. Results showed that transverse modulus, tensile strength, shear strength and screw-holding power were all functions of density and resin treatment for any given species, but that all were more affected by density than by resin treatment. Hardness was a function of density. The species of wood used affected the dimensional stability of the board, which was also a function of resin treatment and board density. Some details of manufacture in a plant using kiln-dried waste from furniture are given. [Cf. *For. Abstr.* 14 (No. 3944).]

3060. KITAHARA, K. [**The effect of pressure in the first stage of the pressing cycle on properties of hardened chipboard.**] *Wood Ind., Tokyo* 8 (12), 1953 (532, 543–5). 1 ref. [Jap.e.] P.R.

The effect of different pressures during the first stage on thickness, sp. gr., moisture content, water absorption, strength and hardness are shown in graphs and tables with English legends. High pressure in the early stages is desirable to give good-quality boards.

3061. **Wood-based and fibrous sheet materials, properties and applications**. *Wood* 19 (1), 1954 (19–59).

Comprises the following papers: (1) Fibreboard: The pattern of development (*E. P. Lawrence*); Types of fibreboard; British Standards; manufacture; Architectural uses; Treatments and finishes; Plastering and concreting; Some physical properties; Thermal transmission coefficients; and Thermal insulation. (2) Chipboard: A contemporary material (*A. G. Marshall*); Uses in building; Some applications. Physical properties; and Surface finishes.

3062. PORTER, R. W. **Modernization at Maizewood's insulating-board mill**. *Paper Industry* 32 (3), 1950 (270–4). P.O.

An account of the manufacture of Maizewood (wallboard) from flax shives, waste paper, wood, and almost any other fibrous material. Flax and wood chips are cooked together in rotary digesters, after which they are defibred, sized, formed, and pressed.

3063. BAIRD, P. K., and SCHWARTZ, S. L. **Hardboard: processes, properties, potentials**. *Rep. U.S. For. Prod. Lab., Madison* No. *D*1928, 1952. pp. 16. 18 refs. P.R.

A general survey of current methods for the manufacture of hardboards.

3064. GUENTHER, K. W. **Analysis technique for hardboard pilot plants**. *J. For. Prod. Res. Soc.* 3 (5), 1953 (153–5).

Discusses the use of punched cards in quality control. [Cf. *For. Abstr.* 15 (Nos. 2926, 2938, 3016).]

3065. MARRA, G. G., and WILSON, J. W. **Preliminary report on test method for evaluating gluability for hardboard**. *J. For. Prod. Res. Soc.* 3 (4), 1953 (24–8). [Washington State Institute of Technology, Pullman, Washington.]

3066. NARAYANAMURTI, D., and SINGH, J. **Studies on building boards: Part V—utilization of Tapioca stems and Hoop Pine bark**. *Comp. Wood* 1 (1), 1953 (10–7). 9 refs. P.R.

Includes tables for defibrating conditions and chemical composition of pulps; pressing and drying conditions; and physical properties of hardboards obtained from the bark of *Araucaria cunninghamii*.

3067. RUNCKEL, W. J. **Douglas Fir slabs, edgings and bark—wet continuous process hardboard**. *J. For. Prod. Res. Soc.* 3 (5), 1953 (148, 228).

In 'Allwood', manufactured by the Oregon Lumber Company, Dee, Oregon, green, unbarked slabs, edgings and other chippable sawmill waste are chipped and subjected to a continuous wet felting process, using a continuous forming machine and a multiple-opening hot press. The raw material is made up of a number of species, with Douglas Fir predominating. No chemicals are needed to render the hardboard resistant to water absorption and swelling, but 0·75% phenolic resin is added to the standard boards to increase strength and improve machining properties. [Cf. *For. Abstr.* 13 (No. 1709).]

3068. NIXON, G. D. **Suitability of Lodgepole Pine for dry-formed hardboard**. *J. For. Prod. Res. Soc.* 3 (4), 1953 (29–34). 9 refs. [Oregon Forest Products Laboratory, Corvallis.]

Mechanical and physical tests on 114 experimental boards of *P. contorta* var. *latifolia* showed that satisfactory boards could be made. Fibre from chips steamed before binding made stronger boards than that ground from raw chips, and the steamed fibre also appeared to make more efficient use of a

wax emulsion added to improve water-resistance. The maintenance of pH 4 in materials so added reduced water absorption but usually also reduced the strength of the board. Increasing the pressing temperature from 320 to 400° F. generally improved board strength without affecting water-resistance. Waxes as a group improved water-resistance more than rosin sizes.

3069. Schwartz, S. L., and Baird, P. K. **Suitability of Sand Hickory for insulating board and hardboard.** *Repr.* from *Southern Pulp and Paper Manufacturer, Atlanta, Ga.* April 10, 1952. pp. 5. 6 refs. P.R.

Presents data on (1) experimental insulating board from attrition-milled, water-soaked, steamed, or steam-cooked chips, and (2) hardboard prepared from stocks produced in a laboratory Asplund defibrator. Sheathing-grade insulation boards can be manufactured from chips steam-cooked at high temperature and attrition-milled. Acceptable hardboards can be prepared by the Asplund defibrator; perhaps also from attrition-milled, steam-cooked chips, but stocks prepared from water-soaked and from mildly steamed chips by attrition milling are unsuitable for both products. *From authors' summary.*

3070. Mii, M. **[Studies on hardened fibreboards. XI. Sulphite pulp screening waste from Pine wood from the "knotter" as raw material for producing hardened fibreboards by the wet process.]** *Wood Ind., Tokyo* 8 (2), 1953 (51, 73–4). 2 refs. [Jap.e.] P.R.

Physical properties of boards from sulphite pulp and groundwood pulp screenings are shown in graphs. The former were inferior and the material should not be used alone. *From author's summary.*

3071. Tower, G. E. (to Chapman Forest Utilization, Inc.). **Process of forming artificial wood.** *U.S. Patent* No. 2,643,186, June 23, 1953. pp. 8. P.O.

Cellulosic material is reduced to fibres which form a slurry with water; intermediate condensation products of thermosetting phenol-aldehyde resin and paraffin size are added to this slurry, the resin is precipitated by acid, alum is added and, after removing the excess of water by straining, the mass is compressed while heating.

3072. Fuqua, M. C. (to Standard Oil Development Co.). **Polymer treatment for fibreboards.** *U.S. Patent* No. 2,643,200, June 23, 1953. pp. 4 + 2 gphs. P.O.

Application to fibreboard of a partly cured olephinic polymer oil formed by clay treating of a cracked hydrocarbon naphtha and containing ca. 5% (weight) S; and then heating the impregnated board for 2–2½ hours at 225–325° F.

3073. Löfgren, B. E. Värmebehandling och fuktning av wallboard: apparaturens utveckling. **[Heat treatment and moisture conditioning of wallboard: the development of equipment.]** *Norsk Skogind.* 7 (12), 1953 (444–51). [Sw.] P.R.

863. *Wood Hydrolysis. Saccharification*

See also Nos. 3079, 3081.

3074. Iwata, Y., *et al.* **A fundamental study on the wood-saccharification industry in Japan.** *Hakkô Kyôkai Shi* (*Journal of the Fermentation Association*), *Tokyo* 7, 1949 (34–7; 67–70, 73; 131–3; 133–5; 179–82; 259–62). From *Chem. Abstr.* 47 (7), 1953 (3561). P.R.

Sections on: Saccharification with concentrated mineral acid and with dilute mineral acid; Local conditions for factory construction in Japan; Substances inhibiting alcoholic fermentation in the saccharified solution; Alcoholic fermentation of saccharified solutions (all by *Y. Iwata*); and Productions of fats by micro-organisms (*Y. Iwata* and *T. Ikeda*).

3075. Iwata, Y., *et al.* **The industrialization of wood saccharification.** *Journal of Fermentation Technology* (*Japan*), *Osaka* 27, 1949 (239–40; 304–6; 335–8); 29, 1951 (14–6; 17–20; 123–5; 222–4). From *Chem. Abstr.* 47 (4), 1953 (1929); 47 (7), 1953 (3561). P.R.

Contains 7 papers: Pilot-plant test with dilute H_2SO_4 and high pressure (*Y. Iwata, H. Kawakami, K. Takahashi,* and *T. Yamaguchi*); Substances inhibiting alcoholic fermentation in the saccharified solution (*Y. Iwata*); Manufacture of alcohol from the saccharified solution (*Y. Iwata* and *T. Wada*); Synthesis of fats by micro-organisms (*Y. Iwata* and *T. Ikeda*); Manufacture of food yeast (*Y. Iwata*); The geographical location of saccharifying plant (*Y. Iwata*); and The process of raising sugar concentration (*Y. Iwata*).

3076. Nakahara, S. **Saccharification of wood and cellulose-containing substances with high-frequency current.** *Japanese Patent* No. 4972 ('52), Nov. 26, 1952. From *Chem. Abstr.* 48 (1), 1954 (371d). P.R.

Sawdust or the like, with or without activated C, is moistened with 0·4–0·6% H_2SO_4 and treated with 1–5 megacycles/sec. followed by 30–120 megacycles/sec. while 1–15% H_2SO_4 is added.

3077. Odincovs, P. N., and Beinarts, J. J. **The hydrolysis of Spruce wood with 75% H_2SO_4.** *Latvijas PSR Zinātnu Akademijas Vēstis, Riga* 1950 (2), (107–16). [Russ.] From *Chem. Abstr.* 48 (1), 1954 (364d). P.R.

Results are given of an investigation in which Spruce wood flour or chips were extracted with C_2H_5OH/C_6H_6 (1/1), dried, treated with 75% H_2SO_4 for various periods, the acid diluted to 50%, the residue washed with 50% H_2SO_4 and hot water, and dried, and the filtrate tested for sugars. The effect of chip size, temperatures, and times of different operations has been studied.

3078. Odincovs, P. N., Kalniņa, V. K., and Putniņa, M. E. **The hydrolysis of wood with concentrated H_2SO_4, and recovery of $CaHPO_4$** *Latvijas PSR Zinātnu Akademijas Vēstis, Riga* 1950 (2), (117–22). [Russ.latv.] From *Chem. Abstr.* 48 (1), 1954 (364i). P.R.

Presents results of an investigation on a 2- and 4-stage acid hydrolysis of Spruce sawdust. In the 2nd stage of the 4-stage hydrolysis, a suspension of

apatite was added to the product, after which the hydrolysate contained H_3PO_4 which was recovered as $CaHPO_4$. Total carbohydrate recovery was 96%.

864. *Utilization of Lignin*

See also No. 2998.

3079. Šorygina, N. N., and Kolotova, L. I. Hlorirovanie gidroliznogo lignina. [**Chlorination of hydrolysis lignin.**] *Izvestija Akademii Nauk SSSR (Otdelenie Himičeskih Nauk), Moskva* 1953 (3), (562–6). 7 refs. [Russ.russ.] L.S.

Commercial hydrolysis lignin is easily chlorinated at 20° C. by Cl in CCl_4 or Cl water. When chlorinated without Cl excess and without a catalyst, the number of OH groups in the lignin does not change. The methoxyl content decreases even during mild chlorination, particularly when Cl water is used.

866. *Utilization of Wood Extractives*

See also No. 3081.

3080. Thommen, E. K. Veränderungen im Fichtenharz bei der Holzlagerung. [**Changes in Norway Spruce resin during timber storage.**] *Svensk PappTidn.* 56 (24), 1953 (937–40). 5 refs. [G.g.e.sw.] P.R.

Resin amounts by Soxhlet extraction from fresh and from stored wood cannot be compared. The amounts vary widely with the degree of fineness to which the wood is reduced and this is affected by shrinkage during storage: freshly felled wood yielded less resin than similar wood after storage. Resin that can only be extracted after fine comminution has a different chemical composition from the usual Soxhlet extract. The highest O content (13·7%) was found in the green wood; the hardening of resin during wood storage cannot, therefore, be attributed to oxidation. *From author's summary.*

867. *Destructive Distillation*

See also No. 2807.

3081. Bergström, H. Kolningslaboratoriet 1902–1952. [**The work of Kolningslaboratoriet [The Charcoal Laboratory, Stockholm] 1902–52.**] Kolningslaboratoriet, Stockholm. 1952. pp. 104 + 21. [Sw.e.] P.R.

Includes chapters on: the wood (extractives, resins, changes during storage, saccharification); charcoal burning in pits; charcoal burning in kilns; charcoal; by-products from charcoal burning; sulphate liquor; by-products from sulphate pulping; sulphite liquor; by-products from sulphite pulping; and spontaneous combustion of wood, charcoal and fibreboards; with a list of publications by the Laboratory.

3082. Misson, A. La carbonisation du bois au Katanga. [**Wood carbonization in Katanga.**] *Bull. agric. Congo belge* 45 (1), 1954 (69–93). 2 refs. [F.flem.]

Discusses the industrial and domestic demand for charcoal, available timber supplies, methods of manufacture, native and European exploitation of the forests for charcoal, the rôle of the forest service and prospects for the future.

3083. Aries, R. S. **The continuous carbonisation of wood in small retorts without recovery of by-products.** *J. For.* 52 (1), 1954 (7–9).

Names 8 recirculation processes and gives general notes on construction and installation and operation, labour, and yield of charcoal. The competition of synthetics rules out the recovery of distillates but there is a future for small-scale production of charcoal in America.

3084. Lukács, I. A falepárlás elmélete és gazdasági jelentösége. [**Theory and economic importance of wood distillation.**] *Erdö* 1 (2), 1952 (135–9, 163–4, 167). [Hung.russ.f.]

Experiments have demonstrated a considerable future for mobile retorts that will do the primary distillation in the forest, using thinnings for the most part; the distillation products will then be transported for final processing to a central permanent plant.

3085. Minami, K., and Kawamura, K. **Studies on carbonization of wood IX [*sic*]. On the source of acetic acid produced in the thermal decomposition of the wood of *Quercus glauca*.** *J. Jap. For. Soc.* 35 (10), 1953 (315–21). 10 refs. [E.e.jap.]

Cf. *For. Abstr.* 14 (Nos. 2883–5).

3086. Kalniņš, A. I., and Streipa, P. P. **Recovery of wood tar from retort with stirred vapors and gases.** *Latvijas PSR Zinātnu Akademijas Vestis, Riga* 1949 (5), (29–39). [Latv.russ.] From *Chem. Abstr.* 48 (1), 1954 (346b). P.R.

89. OTHER ('MINOR') FOREST PRODUCTS

See also section 28.

892. *Vegetable Products*

See also No. 2294.

892.4. Bark Products. Tanstuffs. Cork

See also Nos. 2409, 3050, 3066–7.

3087. Gerngross, O., and Gülbaran, E. Gerbstoffanalytische Untersuchungen an den Borken der türkischen Kiefernarten *Pinus nigra, P. sylvestris, P. pinea* und *P. brutia.* [**Analytical research on tannins in the outer bark of the Turkish *Pinus* species: *P. nigra, P. sylvestris, P. pinea* and *P. halepensis* var. *brutia*.**] *Leder, Darmstadt* 3 (8), 1952 (169–74). 17 refs. [G.] L.S.

P. nigra bark, with 2·7–5·4% tannin content, has no industrial value. The tannin content in the bark of *P. sylvestris* has been found to decrease steadily with age, from ca. 9% at 35 years to ca. 2% at 250 years; the living inner bark of this species contains more tannins than the dead outer bark. The bark of *P. pinea* contains 12·8–20·2% tannin, and is the reddest of the *Pinus* barks tested. In *P. halepensis* var. *brutia* bark, the tannin content varies from 8·8% at 20 years to 34·1% at 225 years.

3088. Gerngross, O., and Gülbaran, E. Das Rinden-Borken-Gerbstoffproblem. [**The problem of tannins in the inner and outer bark.**] *Leder, Darmstadt* 3 (9), 1952 (205–10). 19 refs. [G.g.] L.S.

Discusses and explains for the genus *Pinus* the morphological and functional differences between

inner and outer bark and the formation of dead rough-bark tissue from the living bast. The raw tanstuff material from *P. halepensis* and *P. h.* var. *brutia* consists of the outer, and not the inner bark. Sulphitization tests and the determination of the phlobaphene value for *P. h.* var. *brutia*, *P. pinea*, *P. sylvestris* and *P. nigra* have shown that the phlobaphene value decreases as the tannin content increases.

3089. Haglund, A. Beiträge zur Kenntnis des Fichtenrindengerbstoffes. III. Änderung der Alkoholfällungszahl bei feuchter Lagerung der Fichtenrinde. [**Studies on Spruce bark tannin. III. Variation of the alcohol precipitation number when Spruce bark is stored moist.**] *Leder*, *Darmstadt* 4 (3), 1953 (55–8). 8 refs. [G.g.] B.L.M.R.A.

During moist storage with some ventilation, the alcohol-insoluble portion of the water-extractible Spruce-bark tannins increases, and the excess has a very high viscosity. [Cf. *For. Abstr.* 14 (No. 2889).]

3090. Stirtz, T. Holzbohrkäfer in Fichtenrinde. [**Wood-boring beetles in Spruce bark.**] *Leder*, *Darmstadt* 3 (11), 1952 (273–4). 2 refs. [G.] L.S.

Describes an infestation of stored Spruce bark with *Stephanopachys substriatus* in S.W. Germany. [Cf. *For. Abstr.* 15 (No. 950).]

3091. Sakata, K., and Kishimoto, J. [**The tannin in bark of *Salix koliyanagi* (1).**] *J. Jap. For. Soc.* 34 (12), 1952 (373–7). 8 refs. [Jap.jap.e.]

Gives details of chemical composition and, in tables with English legends, figures showing the effect of different processing factors on yields.

3092. Jensen, W., and Rinne, P. **Studies on suberin. V. The constitution of phloionic acid from the suberin of *Quercus suber*. VI. Isolation and constitution of phloionolic acid from the suberins of *Betula verrucosa* and *Quercus suber*.** *Pap. ja Puu* 35 (11), 1953 (407–8). 8 refs. [E.e.]; 36 (2), 1954 (32–4). 6 refs. [E.] P.R.

Cf. *For. Abstr.* 14 (No. 2895).

3093. Seoane, E., and Ribas, I. Sobre la quimica del corcho. VII. Los ácidos floiónico y floionolico. [**The chemistry of cork. VII. Phloionic and phloionolic acids.**] *Anales*, *Real Sociedad Española de Física y Química*, *Madrid* 47*B*, 1951 (61–6). 10 refs. [Span.span.e.] P.R.

Discusses the extraction methods and the synthesis of the acids, and suggests a new method of extracting and purifying phloionic acid.

3094. Hergert, H. L., and Kurth, E. F. **The isolation and properties of catechol from White Fir [*Abies concolor*] bark.** *Repr.* from *Journal of Organic Chemistry*, *Baltimore* 18 (5), 1953 (521–9). 20 refs. P.R.

Cf. *For. Abstr.* 14 (No. 3966).

892.5. Medicinal Plants, Edible Plants, Insecticides from Plants etc.

3095. Kazmi, M. A. **On the drug plants of Kalat State.** *Pakistan J. For.* 3 (4), 1953 (217–23). 4 refs.

3096. Kazmi, M. A., and Siddiqui, I. A. **Medicinal plants of Astore and upper Guraiz valleys.** *Pakistan J. For.* 3 (4), 1953 (186–213 + 2 plates). 38 refs.

3097. Walker, A. R. Usages pharmaceutiques des plantes spontanées du Gabon. [**Medicinal uses of plants native to Gabon.**] *Bulletin de l'Institut d'Études Centrafricaines*, *Brazzaville* (*n.s.*) Nos. 4–6, 1952–53 (181–6; 19–40; 275–329). [F.]

3098. Fulling, E. H. **American Witch Hazel—history, nomenclature and modern utilization.** *Econ. Bot.* 7 (4), 1953 (359–81). 104 refs.

3099. Tomita, M., and Nakano, T. **Studies on the alkaloids of magnoliaceous plants. V–VIII.** *Journal of the Pharmaceutical Society of Japan*, *Tokyo* 72 (6; 10), 1952 (727–31, 766–7; 1256–62). 18 refs. [E.e.] L.S.

(V) *Magnolia kobus*; (VI) *M. stellata*; (VII) Syntheses of salicifoline chloride and analogous compounds; (VIII) *M. denudata.*

3100. Cercós, A. P., and Rodríguez Berretta, H. T. Acción antimicrobiana de algunas Fanerógamas argentinas. [**Antibiotic action of some Argentine phanerogams.**] *Idia* No. 69, 1953 (1–7). 16 refs. [Span.] C.G.B.

Extracts of leaves of numerous Argentine species were tested for their antibiotic properties against *Bacillus subtilis* and *Escherichia coli.* A list of species is presented, graded according to their antibiotic properties, and includes a number of woody species, mainly shrubs.

892.6. Resin and Turpentine. Essential Oils. Fixed Oils and Fats. Gums. Latex. Dyestuffs. Sap Sugar

See also Nos. 2539 *et seq.*, 2809, 3038, 3114.

3101. **Gum turpentine may become new source of peroxides.** *Naval Stores Rev.* 63 (24), 1954 (15).

A simple and economical process has been evolved by the Naval Stores Station, Olustee, Florida, of producing pinane hydroperoxide from turpentine. The new product may help to extend the turpentine market, which needs stabilizing in face of rising competition from new chemical industries.

3102. Bardyšev, I., and Livšic, R. I. O sostave sosnovogo flotacionnogo masla. [**Composition of Pine flotation oil.**] *Žurnal Prikladnoĭ Himii*, *Moskva* 25 (12), 1952 (1289–95). 10 refs. [Russ.russ.] D.S.I.R.

Results of analyses are graphed and tabulated.

3103. Bardyšev, I., and Bardyševa, K. Sostav skipidara sosny avstriĭskoĭ. [**Composition of the turpentine of *Pinus nigra* var. *austriaca*.**] *Žurnal Prikladnoĭ Himii*, *Moskva* 25 (11), 1952 (1231–3). 4 refs. [Russ.russ.] D.S.I.R.

The turpentine from Russian-grown trees contains α-pinene, camphene, β-pinene, myrcene and limonene.

3104. Bardyšev, I., and Bardyševa, K. Svoĭstva i sostav skipidara sosny krymskoĭ. [**Properties and composition of turpentine of *Pinus nigra* var.**

caramanica.] *Žurnal Prikladnoĭ Himii, Moskva* 25 (10), 1952 (1095–8). 6 refs. [Russ.russ.] D.S.I.R.

While varying from one tree to another, the main constituents of turpentine from 2 resin samples collected in the Dnieper area were: α-pinene, with some camphene, β-pinene, β-myrcene, *l*-limonene, and other compounds.

3105. Bukała, M., and Kuczyński, H. Badania nad składem polskich terpentyn z *Pinus sylvestris*. **[Studies on the composition of Polish turpentine oils from *P. sylvestris*.]** *Roczniki Chemii, Warszawa* 26 (1), 1952 (58–84). 34 refs. [Pol.pol.e.] L.S.

The standard constituents of Polish turpentine oils have been found to be: *d*-α-pinene, *l*-β-pinene, *d*- Δ^3-carene, dipentene, *l*-limonene and terpinolene. An unidentified constituent (probably a monocyclic hydrocarbon with 2 double bonds) has been detected.

3106. Kuczyński, H. Badania nad frakcją alkoholową polskiej terpentyny ekstrakcyjnej z *Pinus sylvestris*. **[Investigations on the alcohol fraction of turpentine oil extracted from [the stumps of] *P. sylvestris* in Poland.]** *Roczniki Chemii, Warszawa* 26 (2), 1952 (143–57). 28 refs. [Pol.pol. g.] L.S.

Besides *d*,*l*-fenchol, *d*,*l*-borneol, terpinenol-4 and *d*-α-terpineol, the turpentine oil examined has been found to contain ca. 35% *d*-silveterpineol which is the hydration product of Δ^3-carene.

3107. Bhati, A. **Essential oil from the berries of *Juniperus communis* Linn.** *Journal of the Indian Institute of Science, Bangalore* 35*A* (1), 1953 (43–6). 2 refs. L.S.

It has been found that *d*-α-pinene is the major constituent of the essential oil from the berries of *J. communis* grown in East Punjab.

3108. Bhati, A. **The identification of *d*-α-phellandrene in the essential oil of leaves of Bel, *Aegle marmelos*.** *Journal of the Indian Institute of Science, Bangalore* 35*A* (1), 1953 (39–42). 20 refs. L.S.

The presence of this phellandrene has been definitely established.

3109. Narayan, V. L., and Muthana, M. S. **Essential oil from *Premna tomentosa*.** *Journal of the Indian Institute of Science, Bangalore* 35*A* (1), 1953 (55–67). 28 refs. L.S.

The essential oil from leaves of *P. tomentosa* has been found to contain 57·8% limonene, 17·2% β-caryophyllene, 7·8% new sesquiterpene hydrocarbons, and two unidentified constituents.

3110. Batterson, V. C., and Potts, W. M. **The analysis and characterization of the oil from the seed of *Stillingia sylvatica*.** *Journal of the American Oil Chemists' Society, Champaign, Ill.* 28 (3), 1951 (87–8). 6 refs. L.S.

The oil is a drying oil and has a high I value.

3111. Hanks, D. P., and Potts, W. M. **An investigation of the oil from the seed of *Sebastiana ligustrina*.** *Journal of the American Oil Chemists' Society, Champaign, Ill.* 28 (7), 1951 (292–4). 6 refs. L.S.

The seeds contain 37% oil, the properties of which are graphed and tabulated.

3112. Pinto, G. Pereira. Contribuição ao estudo químico de sêbo de ucuúba. **[The chemistry of the seed fat of *Virola surinamensis*.]** *Bol. téc. Inst. agron. Norte* No. 23, 1951 (3–63). 10 refs. [Port.port.e.]

3113. **Gum arabic investigation.** *Rep. For. Dep. Sudan 1951/52*, 1953 (36–8).

In order to determine the origin of 'stringy gum', an investigation was made on gum from 5 different plots of *Acacia senegal*. Results (tabulated) indicate that the stringiness is most general in samples collected early in the season and diminishes with later collections. No evidence was found of correlation with locality, size of tree, or weight of gum produced.

892.7. Fruits, Seeds. Fibres, Yarns and Flosses

See also Nos. 3107, 3110–2.

3114. Ukita, T., and Tsumita, T. **Studies on the resin acid in the fruits of *Juniperus japonica*.** *Journal of the Pharmaceutical Society of Japan, Tokyo* 72 (10), 1952 (1324–7). 4 refs. [E.e.] L.S.

Two isomers have been obtained in a pure state from the fraction of diterpenic acid isolated from the fruits of *J. japonica*, viz. $C_{20}H_{30}O_2$ (a new acid), and the 7-isodextropimaric acid.

3115. Maymone, B., and Battaglini, A. Ricerche sulla digeribilità e sul valore nutritivo del 'germe' di carruba (*Ceratonia siliqua* L.). **[Studies on the digestibility and nutritive value of the 'germ' [embryo and cotyledons] of the Carob bean (*C. siliqua*).]** *Ann. Sper. agr.* (*n.s.*) 7 (6), 1953 (1977–84). [It.it.e.] C.G.B.

Cf. *For. Abstr.* 12 (No. 1740).

3116. Maymone, B., and Battaglini, A. Ricerche sul valore nutritivo delle polpe di carrube esaurite, residuate della preparazione industriale dell'alcool. **[Studies on the nutritive value of residual pulps of Carob beans after the manufacture of industrial alcohol.]** *Ann. Sper. agr.* (*n.s.*) 7 (6), 1953 (1985–99). 3 refs. [It.it.e.] C.G.B.

Although the chemical composition of these residues appears good, digestibility was found to be nil or very low.

892.8. Heather. Broom etc. Osiers. Canes and Bamboos. Reeds and Rushes. Thatching Materials

See Nos. 2308, 2967, 2999, 3042–3.

9. FORESTS AND FORESTRY FROM THE NATIONAL POINT OF VIEW. SOCIAL ECONOMICS OF FORESTRY

90. GENERAL

902. *History of Forests and Forestry*

See also Nos. 2350–3, 2356, 2774, 3121, 3164.

3117. EDLIN, H. L. **Names of Welsh forests.** *Quart. J. For.* 48 (1), 1954 (47–9).

Gives origin and meaning of more than 70 names of Welsh forests.

3118. THOMSON, T. R. **[History of] Bradon Forest [Wilts].** Cricklade Historical Society. [1953]. pp. 30 + 2 tbls. + map. Price 10*s.* 6*d.*

3119. TURC, L. Les sources de la sylviculture de Maclot: les ordonnances de l'Archiduc Albert et de l'Infante Isabelle-Claire-Eugénie. **[The origins of 'La sylviculture de Maclot': the ordinances of the Archduke Albert and the Infanta Isabella-Clara-Eugenia.]** *Rev. for. franç.* 6 (1), 1954 (25–50). [F.]

Continues into the 17th century the history of the regulation of the woodlands that supplied the salt-works of Salins with firewood. [Cf. *For. Abstr.* 14 (No. 2922).]

3120. COINTAT, M. La dégradation des forêts dans le département du Gard. **[The degradation of the forests of Gard.]** *Rev. for. franç.* 6 (2), 1954 (99–114 + 4 photos + 1 map). 27 refs. [F.]

An historical study.

903. *Forest Policy, General*

See also No. 3142.

3121. PEIRSE, SIR H. B. **Forest policy and legislation affecting Scotland (1854–1953).** *Scot. For.* 8 (1), 1954 (15–31 + 2 photos).

3122. MADAS, A. Az erdögazdaság távlati terve. **[Long-term planning in forestry.]** *Erdö* 1 (1), 1952 (9–15, 93–4, 97). [Hung.russ.g.]

The author points out that about 100,000 *hold* of the present forest area of Hungary are liable to flooding and another 100,000 *hold*, although unsuitable, are used for agriculture—factors to be taken into account in planning the distribution of tree species over the next 20 years. On principle, the proportion of Oak should remain as at present, the area under conifers should be increased fourfold, that under Poplar more than doubled, that under Beech should be increased slightly, that under Turkey Oak reduced by 50%. The area under Hornbeam should be about maintained, but this species must be eliminated from areas where it forms pure stands on good soil; it may, however, be introduced as a secondary species in many places under Oak, *Pinus sylvestris* etc. Robinia, too, should maintain its present area; but it must be removed from poor sandy areas and kept for the better ones, in mixture with other species. Two key problems in Hungarian forestry planning are the planting of conifers and the planting of Poplar. The Silvicultural branch of the Forestry Centre has worked out a detailed long-term plan for conifer planting, county by county and species by species. In 5 years 100,000 *hold* of Poplar are also to be planted. [Cf. *For. Abstr.* 15 (Nos. 2480–2).]

3123. ROBERTSON, A. F. **A review of forestry in Hong Kong with policy recommendations.** Government Printer, Hong Kong. 1953. pp. 30. Price $ Hong Kong 2·00.

3124. **Forest policy.** *Rep. For. Dep. Tanganyika 1952*, 1953 (68–72).

The interim forest policy for Tanganyika aims at reservation of 8% of the territory and planting 40,000 acres by 1962. The policy, its implications and the steps to be taken to implement it are set out here in the resolution of the Legislative Council of 12 Feb. 1953.

3125. DUNN, P. M. **A new forestry program for Chile.** *Naval Stores Rev.* 63 (24), 1954 (12–4, 29).

Notes on U.S. and FAO missions to Chile, the introduction of a forestry curriculum at the University of Chile, the natural resources of Chile and progress to date in the initiation of a forest policy.

3126. RIVERA E., R. Aspectos de una política maderera en Chile. **[Aspects of a timber policy for Chile.]** *Chile maderero* 3 (14), 1953 (1–3). [Span.]

Considers and discusses the forest resources of Chile and problems affecting reforestation and the production of timber, plywood, charcoal, pulp and paper.

904. *General Regional Accounts of Forests and Forestry*

See also No. 3144.

3127. GLOVER, SIR H. **Some aspects of dry-zone forestry.** In *Desert Research*, Research Council of Israel, Jerusalem. 1953 (259–65).

Notes on forests in various arid regions, including the Punjab, the Levant, Kenya and Peru. [Cf. *For. Abstr.* 15 (No. 2191).]

3128. POCKBERGER, J. Waldbau in der Schweiz. **[Swiss silviculture.]** Österreichisches Produktivitäts-Zentrum, Wien. 1953. pp. 96. [G.g.]

Reports on a tour of study in 1952 by 15 Austrian specialists, with a section containing general background information on Swiss forestry.

3129. PLATEAU, H. La forêt marocaine. **[The forests of Morocco.]** *Terre maroc.* 27 (288; 289), 1953 (363–71; 434–6). 6 refs. [F.] E.M.B.

History, the forests to-day, the organization and work of the forest service, and legislation.

905. *Forest Statistics and Resources*

See also Nos. 2788, 3146.

3130. Exploitation des bois, commerce du bois, chasse et pêche: statistiques diverses établies par l'Administration des Eaux et Forêts, exercices 1945–1948. **[Forest exploitation, the timber trade, hunting and fishing: statistics collected by the Administration des Eaux et Forêts [of Luxembourg] for the financial**

years 1945–8.] Administration des Eaux et Forêts, Luxembourg. 1949. pp. 249. [F.]

3131. Rapport annuel et statistiques diverses de l'Administration des Eaux et Forêts: Exercices 1949–50 et 1950–51. [**Annual report and statistics of the Administration des Eaux et Forêts for the financial years 1949/50 and 1950/51.**] Administration des Eaux et Forêts, Luxembourg. 1951. pp. 31. [F.]

3132. Skogsstatistisk årsbok 1951. [**Statistical yearbook of forestry, 1951.**] Kungl. Skogsstyrelsen, Stockholm. 1953. pp. 158. [Sw.e.]

In contrast to its predecessor under the title *Det enskilda skogsbruket* [cf. *For. Abstr.* 13 (No. 2666)] this new series will contain data not only on private but on all Swedish forests, plus sections dealing with utilization, marketing and transport etc. It is stressed that some of the sections are far from complete, but that progressive improvement is to be made as the series continues. Each issue will contain a running text reviewing the situation and a purely tabular section for the numerical data. The matter is arranged under the heads: Forest land and forest capital (area, timber resources and value; regeneration and tending; forest injuries). 'Technical activities' (engineering works; management plans). Utilization (logging and transport; consumption and production in the wood industries; foreign trade). Prices and logging costs. Labour statistics. Game and hunting. Other matters (state and private forest administration; the Forest Research Institute; education and training; associations and organizations; State subsidies for silviculture). Review of Sweden's position on the international market. Sources of data.

There is a summary in English, and table headings are given in both Swedish and English.

3133. Streyffert, T. Forst- und Holzwirtschaft in Schweden. [**Forest economy and the wood industries in Sweden.**] *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953 (11–8). [G.sw.]

Discusses briefly data on the existing growing stock and its probable development and present and future supplies of wood for industry and export.

3134. Domänverket år 1952 av Kungl. Domänstyrelsen. [**Work in the State Forests, 1952, by the Royal State Forestry Board.**] *Sveriges officiella Statistik: Skogshushållning.* Kungl. Boktryckeriet. P. A. Norstedt & Söner, Stockholm. 1954. pp. viii + 135. [Sw.]

3135. Vogel, K. Försök att upprätta en skogsodlingsfacit för norra Sverige. [**A survey of artificial regeneration in N. Sweden.**] *Norrlands SkogsvFörb. Tidskr.* 1953 (3), (411–24). [Sw.]

A survey for the years 1936 to 1950 showing for each year in graphs (1) the area in ha. on which artificial regeneration took place, (2) the figures as a % of (*a*) land capable of forest production and (*b*) the estimated need, for different ownership classes. The graphs show the figures for the northern counties individually, and the total figures for N. Sweden compared with those for the country as a whole.

3136. Craig, D. A. **Timber resource review.** *Sth. Lumberm.* 187 (2345), 1953 (133–6).

Discusses the survey at present being made by the U.S. Forest Service, showing the forest regions to be covered, and outlining the scope of the report.

3137. **Forest statistics for Alabama: a report of the Southern Forest Survey.** *For. Surv. Release Sth. For. Exp. Sta.* No. 73, 1953. pp. 52.

3138. Pissot, H. J. **Forest resources of north Idaho.** *Sta. Pap. Nth. Rocky Mt. For. Range Exp. Sta.* No. 35, 1953. pp. 37.

3139. Entrican, A. R. **Statistics of the forests and forest industries of New Zealand.** New Zealand Forest Service, Wellington. 1953. pp. 34.

Statistics on forest resources; forest service operations; timber production, consumption, transport, imports and exports; plywood and veneer; wood pulp and pulp products. Most of the figures are given from 1921 to 1953.

906. *Direct Economic Significance of Forests (Position of Forests and Forestry in the National Economy)*

3140. Prest, A. R., and Stewart, I. G. **The national income of Nigeria 1950–51.** H.M. Stationery Office, London. 1953. pp. viii + 123. 115 refs. (*Colonial Research Studies* No. 11.) Price 8*s.* 6*d.*

Directed by the Department of Applied Economics at Cambridge this survey covers the principles and purposes of estimation, the 1950–51 income of Nigeria by regions, important sectors (government accounts, capital formation, balance of payments), conclusions and suggestions and reliability of the survey's estimates. The form of the government annual estimates is severely criticized as an infuriating mixture of real transactions and money transfers. Good statistics are essential for the elucidation of correct policy in development and this enquiry leads to some surprising refutations of accepted preconceptions. Forest products were valued at £74·9 million; of this, firewood was £20 million as compared with only £76,000 calculated from the Forestry Department's consumption figure for 1949–50.

907. *Indirect Significance of Forests (Rural Amenity, National Parks, Forest Influences etc.)*

See also Nos. 2201 *et seq.*, 2230 *et seq.*, 2248, 2380.

3141. Kozdon, P. Las plantaciones forestales más antiguas junto al Lago Nahuel Huapí y las condiciones forestales de este Parque Nacional argentino. [**The oldest forest plantations near Lake Nahuel Huapí and the state of the forests in this Argentine National Park.**] *Chile maderero* 3 (15), 1953 (1, 5). 3 refs. [Span.]

A short history and descriptions of these plantations. [Cf. *For. Abstr.* 15 (No. 2416).]

91. LAND USE, LAND-USE POLICY (INCLUDING AFFORESTATION POLICY)

See also Nos. 2531, 3122, 3166.

3142. Elorrieta y Artaza, O. Las tierras incultas y los montes en la política económica de

España. **[Uncultivated lands and forests in the economic policy of Spain.]** [Escuela Especial de Ingenieros de Montes], Madrid. 1948. pp. 204 + 7 plates. [Span.]

Problems connected with land use and the economy of Spain are considered and discussed under the following heads: definition of forest land; human influence on the forests; forest economy in Spain; Spanish laws affecting cattle raising; the history of agricultural policy in Spain and of the policy governing forests and waters; the present situation of the Spanish forests; forest ownership; the reforestation and conservation of waste land; and the economics of forest production. In conclusion, recommendations are made concerning ownership, afforestation, management and exploitation of the Spanish forests.

3143. Heske, F. Möglichkeiten und Notwendigkeiten forstlicher Dürrbekämpfung in Kleinasien. **[The possibility of drought control in Asia Minor and the need for it.]** [*Pre-issue*] *Proc. Congr. int. Union For. Res. Organ., Rome, 1953* Section 11 (No. 5), 1953. pp. 4. [G.] Limited distribution.

Discusses the effects (steppe-formation, soil erosion and drought) of destruction of the forests by over-felling, shifting cultivation and uncontrolled grazing. Recommended measures include: control of land use and of felling; reforestation of forest sites in areas threatened by erosion; planting shelterbelts; and establishment of research centres. [Also in *Z. Weltforstwirt.* 16 (6), 1953 (208–17), with summaries in English and French.]

3144. Eyre, V. E. F., Ramsay, D. M., and Jewitt, T. N. **Agriculture, forests and soils of the Jur ironstone country of the Bahr El Ghazal province, Sudan.** *Bulletin, Ministry of Agriculture, Sudan* 1953. pp. 50 + 4 maps. Price *Pias*.20.

Describes the agricultural practices of the Jur, forest types and soils.

3145. Robinson, D. A. **Land use planning in native reserves in Southern Rhodesia.** *Rhod. agric. J.* 50 (4), 1953 (327–33). 7 refs. E.M.B.

Outlines briefly the shifting-cultivation procedure customary in the Chipinga district as an example of the practice, which, however, varies in different parts of the Colony; discusses land classification and land-use planning and describes the land-use system and land-use plan at present in force in the native reserves of S. Rhodesia.

3146. Kauffmann, E. [Editor]. **The Conservation Yearbook 1953: a directory and guide to facts, figures and people in American conservation.** The Conservation Yearbook, 1740 K Street N.W., Washington 6, D.C. 1953. pp. 320. Price $5·50 (£2. 5*s*.).

Includes statistics on water, land use, forests and forest industries, organization and personnel of conservation agencies, lists of national parks, forests, reserves etc.

3147. Holopainen, V. Die finnische Siedlungstätigkeit nach dem Zweiten Weltkrieg und ihre forstwirtschaftliche Auswirkung. **[Resettlement in Finland after the Second World War and its effect on forestry.]** *Z. Weltforstwirt.* 16 (6), 1953 (217–21). 6 refs. [G.e.f.]

Discusses the effect on the distribution of forest ownership and on timber production of the settlement, mainly on small farms on land under State or other publicly owned forest, of the population from land ceded to Russia.

3148. **European Forestry Commission 6th session, Rome, 8–16 October 1953: Reports on afforestation and reforestation: Northern Ireland.** FAO, Rome. No. *FAO/EFC/59–Q*. 1953. pp. 8.

3149. Siloret, G. La mise en valeur des landes de Gascogne. **[The rehabilitation of the Gascony landes.]** *Terres de France, Paris* No. 3, 1953 (10–24). 4 refs. [F.]

Discusses the problems of land use in the *landes*, raised in acute form by the recent disastrous fires, and particularly the balance of forestry, agriculture, and animal husbandry.

3150. Rey, P. L'évolution de la végétation dans la Grande Lande de Gascogne. **[The development of the vegetation on the 'Grande Lande' of Gascony.]** *Trav. Lab. for. Toulouse* 1 (5) Art. 8, 1951. pp. 6. 5 refs. [F.]

A study of this typical *lande*, burnt in 1942, 1943, 1945 and 1949 indicates that it naturally develops a stable vegetation of *Molinia*, *Ulex* spp., *Erica* spp. and *Calluna vulgaris*. Reclamation should be carried out by (*a*) drainage and cultivation; (*b*) sheep grazing, and (*c*) afforestation, in one integrated scheme.

3151. Baptista, M. Martins. Aspectos do problema florestal da Guiné Portuguesa. **[The forest problem of Portuguese Guinea.]** *Repr.* from *Boletim Cultural da Guiné Portuguesa, Lisboa* No. 7, [1952] (717–36). [Port.]

Deals with the destruction of the forests for agricultural purposes; agricultural problems and the future of the forests; native agricultural practices and their influence on both national economy and the vegetation of the country; the advisability of subsidizing reforestation; areas most in need of reforestation and suitable species for the purpose.

92. FOREST OWNERSHIP AND OWNERSHIP POLICY

922. *Publicly Owned Forests*

3152. Numero speciale dedicato all'ampliamento del demanio forestale dello Stato. **[A special number devoted to the increase in the forest estate of the [Italian] State.]** *Monti e Boschi* 4 (11/12), 1953 (481–584). [It.e.]

Reviews recent acquisitions, new plantations etc. Recent acquisitions amount to 19,000 ha. of waste land and scrub woodland that is to be improved and planted.

923. *Privately Owned Forests*

3153. Packman, D. J. **Woodlots on Ontario farms.** *Publ. Dep. Agric. Can.* No. 890, 1953. pp. 39. 17 refs.

A study of financial returns from woodlots on 162 Ontario farms.

93. PUBLIC SUPERVISION AND REGULATION OF FORESTRY, INCLUDING LEGISLATION FOR THESE PURPOSES

See also Nos. 3121, 3129, 3165.

3154. SETTEN, G. VAN. Het Bosschap en de Overheid. [**The Forestry Board and the authorities.**] *Ned. Boschb.-Tijdschr.* 26 (1), 1954 (1–6). [Du.]

An account of the functions and responsibilities under the State of the proposed Forestry Board in the Netherlands.

3155. HALBERTSMAA, S. J. Het Bosschap en de particuliere bossen. [**The Forestry Board and private forests.**] *Ned. Boschb.-Tijdschr.* 26 (1), 1954 (6–12). [Du.]

An account of the proposed representation of forest owners and workers on the Board, of the levy on forest land to finance it, and of its value to private forest owners.

3156. KANKARE, O. Näkökohtia metsätaloutemme järjestelystä lainsäädännön valossa. [**The management of our forests in the light of forest legislation.**] *Metsät. Aikak.* 1953 (11), (353–8, 360). 10 refs. [Fi.e.]

Discusses existing and proposed legislation in Finland.

94. OTHER METHODS TO IMPLEMENT FOREST POLICY

945.1. *Advisory and Information Services. Documentation Centres*

See No. 2784.

945.3. *Education. Training*

3157. Skogshögskolan 125 år. [**The 125th anniversary of the Royal School of Forestry.**] *Skr. K. Skogshögsk., Stockh.* No. 12/19, 1953. pp. 154. [Sw.G.E.F.] Price *Kr.*10.

Comprises a brief account of the development and aims of the school plus 8 papers on various subjects [noticed individually in this issue of *Forestry Abstracts*].

945.4. *Research*

See also Nos. 2183, 2231–2, 2274–5, 2548–50, 2784, 2796, 3039, 3081, 3157.

3158. Berättelse över verksamheten vid statens skogsforskningsinstitut under perioden 1946–1952 jämte förslag till arbetsprogram för den kommande femårsperioden. [**Report on work at the State Forest Research Institute during the period 1946–52 and proposals for the programme of work for the next 5 years.**] *Medd. SkogsforsknInst., Stockh.* 43 (6), 1953. pp. 79. [Sw.]

Includes an account of research and a list of published work for each section of the Institute. [Cf. *For. Abstr.* 13 (p. 130).]

3159. **Quinquennial programme of research of the Forest Research Institute, Dehra Dun, for 1948–53.** Forest Research Institute, Dehra Dun. [*n.d.*]. pp. 77.

3160. **Directory of current woodlands research and experimental work in the Canadian pulp and paper industry.** Pulp and Paper Research Institute of Canada, Montreal. 1953. pp. ii + 154.

Lists 147 research projects undertaken by the Institute and 22 pulp and paper companies on forest protection, logging, organization and management and silviculture, showing for each the subject, company and investigator, place and period of investigation, and published and unpublished reports. There is an index of subjects.

3161. WESTVELD, R. H. **Forest research in colleges and universities offering forestry education.** *J. For.* 52 (2), 1954 (85–8).

Gives the history in the U.S.A. of forestry research in terms of budgets voted by 40 schools, the sources of all funds voted for 1951 and the % allocations to silviculture (23·2), management (21·1), utilization (40·8), economics (11·4), and protection (3·5) in the same year. It appears that the states should make a greater effort and that the land grant colleges with their equipped agricultural experiment stations are the logical centres at which to concentrate forest research, this to be supported by co-operation of the State forest services and private industry.

3162. WEITZMAN, S. **Five years of research on the Fernow Experimental Forest [West Virginia].** *Sta. Pap. Ntheast. For. Exp. Sta.* No. 61, 1953. pp. 44.

Research covers compartment studies on integrated timber management, mine-timber management, farm forests and watershed management and a wide variety of small-scale studies including testing of hybrid Poplars, power saws, skid-road erosion and revegetation, and wildlife.

3163. **Annual report of the Forest Research Institute for the year ended 31 March 1953.** *For. Res. Note N.Z. For. Serv.* 1 (6), 1953. pp. 171.

The greater part of the report deals with the present status of a large number of current research projects.

946.1. *Associations. Societies*

See also No. 2784.

3164. STEEL, SIR S. S. **History and activities of the Royal Scottish Forestry Society 1854–1953.** *Scot. For.* 8 (1), 1954 (8–14).

95. FOREST TAXATION

3165. EVANS, J. B. **A forest conservation-taxation experiment in New Hampshire.** *J. For.* 52 (1), 1954 (25–30).

As an incentive to better forestry, to stabilize yield and employment and to improve water conservation, the Forest Conservation and Taxation Act (1949) substitutes for the annual property tax on growing timber, a compulsory yield tax of 10% on stumpage values, due only at felling. To qualify for a 30% abatement of this tax, minimum

cutting standards are laid down which take care of regeneration, tending advance growth, improvement fellings and protection. In 1951, 27% and in 1952, 35% of the volume cut qualified for abatement. The author gives a Tax Commissioner's viewpoint on the history, operation and first results of the Act. [Cf. *For. Abstr.* 14 (No. 1850).]

96. FOREST LABOUR QUESTIONS. LABOUR QUESTIONS IN WOOD TRANSPORT AND THE WOOD INDUSTRIES

See Nos. 2554, 3132.

97. INTERNATIONAL FOREST POLICY AND OTHER INTERNATIONAL COLLABORATION

971. *Congresses. Conferences*

3166. LEWIS, A. B. [Editor]. **Report of the FAO Regional Meeting on land utilization in the tropical areas of Asia and the Far East and the islands of the Pacific, Nuwara Eliya, Ceylon, 17–19 September, 1951.** *FAO Developm. Pap.* No. 17, 1952. pp. 10.

Contains the unanimous conclusions and recommendations of the 13 countries represented.

References: 1. *B.C. Lumberman*, Vancouver; 2. *Canadian National Railways, Press Release*, Ottawa; 3. *CPPA News Bulletin*, Montreal; 4. *Chêne-Liège*, Constantine, Algeria; 5. *FAO Publication*, Rome; 6. *Forestry Commission Press Release*, London; 7. *Forêt*, Neuchâtel; 8. *Forêts de France*, Paris; 9. *India News*, London; 10. *Italia Agricola*, Rome; 11. *Journal of Forestry*, Washington; 12. *New Commonwealth*, London; 13. *New Hungary*, London; 14. *Pulp and Paper Magazine of Canada*, Gardenvale, P.Q.; 15. *Revue Forestière Française*, Nancy; 16. *Revue Internationale du Bois*, Paris; 17. *Timber Trades Journal*, London; 18. *Timberman*, Portland, Ore.; 19. *Unasylva*, Rome; 20. *Wood*, London.

International.

FAO. Proposals are to be made to member governments for the sites of the Central Forest Research Institute and Experiment Stations in Latin America. The proposals include the following: *Central Forest Research Institute*—University of the Andes, Merida, Venezuela. Experiment Stations: *Mexico and Central America*—Turrialba, Costa Rica; *Caribbean*—Rio Piedras, Puerto Rico; *Tropical Andes*—Tingo María Station, Peru; *Southern Andes*—Concepción University, Chile; *Paraná-Plata-Paraguay* and *Amazon* stations—undetermined (**5**; March 1954).

The 3rd FAO Conference on mechanical wood technology was held in Paris, 17–27 May. Subjects discussed included: testing methods; structural grading; methods of testing fire resistance; wood machining technique; and new wood-based building materials (**17**; 20.2.54).

The following conferences were also recently held:

29 March–3 April. Rome. Technical Meeting on Forest Grazing.
5–9 April. Damascus. Regional Poplar Conference for the Middle East.

Other bodies: The following conferences have been arranged:

The 5th International Congress of Soil Science at Leopoldville in the Belgian Congo in August 1954.
The 8th International Botanical Congress in Paris, 2–14 July 1954.
Comité International de Photobiologie at Amsterdam, 23–28 Aug. 1954.
Jubilee Conference of the Association of Applied Biologists, in London, 13–15 Sept. 1954.

Canada. A chair of forest genetics (the first of its kind in Canada) has been instituted at Laval University, Quebec (**15**; March 1954).

A new federal forest biology laboratory is being built at Eden Lake, 20 miles south of New Glasgow, N.S., to study Birch dieback.

Quebec legislature has given a final reading to a law forbidding smoking while walking or driving through woods (**3**; Montreal).

The Canadian Forestry Association have had a railway coach fitted out by Canadian National Railways, which will travel through Quebec, Northern Ontario, New Brunswick and Nova Scotia on a forest protection mission with special emphasis on fire prevention and fire fighting. It has seating accommodation for 52 people to listen to lectures, living quarters for a lecturer, and a small cinematograph projection room. Visits will be advertised in advance. The local community hall will be used for the lecture and films where possible, otherwise the coach itself (**2**; 15.3.54).

Seventeen companies in the pulp and paper field have bought and given to the Canadian public the Canadian patent of the White process for peeling pulpwood by applying, usually during the sap season, a chemical, usually Na arsenite, to trees from which a girdle of bark has been removed. A full description of the process and its use will be published by the companies before the 1954 sap-peeling season (**14**; Feb. 1954).

France. The Centre Technique du Bois, concerned by the number of disastrous fires in sawmills and woodworking shops, has established an advisory service, directed by a former superintendent of the Paris fire service, to help manufacturers and mill-owners to reduce fire risks (**16**; Jan. 1954).

As a result of co-operation between local land-owners, the Forest Service, local government bodies, and the cork industry, an experimental area of some 5 ha. has been established in the communal forest of Soustons (Landes) to study the value of the local and the Portuguese methods of management and collection of cork from *Quercus suber* var. *occidentalis* (said to be hardier than the type) (**4**; 1.3.54).

Dr. A. R. Prevôt of the Institut Pasteur has been investigating with the assistance of the Centre Technique du Bois and the C.N.R.S., the possibility of making hardwood pulp by bacterial decomposition of lignin. Species of *Pseudomonas* obtained from forest soil were found to be able in a few days

to destroy up to 90% of the lignin (native as well as soluble) by aerobic attack on wood, which leaves the cellulose intact. It was then found that several other species of *Pseudomonas* (*P. liquifaciens*, *P. pyocyanea*, *P. stutzeri*, *P. tabacci*) had the same power. The ligninolytic ferments are best prepared in a saline medium with the addition of a phenolic substance, of which tyrosine is the easiest to use. It has thus been proved that bacterial ligninolysis exists and is a rapid and intense process. Further research is needed into the commercial possibilities, e.g. mass production of bacteria and optimum conditions of temperature, pH, rH etc. (**8**; March 1954).

A system of grabs used in conjunction with a lift truck has recently been introduced in France for handling pitprops, pulpwood and other round timber. During recent tests in northern France these grabs were used to load a railway wagon with mining timber. The work, which normally takes 6 men 4 hrs. to do, was carried out in 26 min. with one man driving the truck and another on the wagon. The equipment is manufactured by Société Salev, 9–15 Rue Paul-Bert, Boulogne-Billancourt, Seine (**20**; Feb. 1954).

Great Britain. During the year from March 1953 to March 1954, the Forestry Commission paid more than £13,279 under its 'shilling-a-tail' scheme for encouraging the extirpation of the grey squirrel. This represents a kill of 360,792 squirrels (**6**; 4.5.54).

The Minister of Agriculture and the Secretary of State for Scotland have appointed a departmental committee to consider what measures might be taken within the home timber industry to improve the arrangements for marketing produce from privately owned woodlands (**6**; 5.4.54).

A new light-weight timber tractor has recently been introduced by the Auto-Mower Engineering Co., Ltd., of Norton St. Philip, Bath. The lay-out is unusual in that radiator and engine are mounted well back on the front axle and the exposed front part of the frame houses the winch gear. About 75% of the gross chassis weight bears on the rear axle, and this weight distribution and the provision of a differential lock give increased tractive power. The logs are hauled by the winch to a convenient loading point, and are then lifted by a folding jib crane at the back of the vehicle and deposited on a pole-type trailer to be towed by the tractor (**17**; 13.3.54).

'Okapi' band saws, which are perforated and are said to need no tensioning throughout their life beyond that imparted during manufacture, are being produced and distributed in the United Kingdom by C. D. Monninger Ltd., Overbury Road, London, N.15, and Hodges and Pickles, Dashwood Avenue, High Wycombe, Bucks. The perforations also help in removing sawdust from the saw cut and have a ventilating effect, allowing the saws to remain relatively cool during sawing. In these improved conditions, teeth tend to remain sharp longer (**17**; 20.3.54).

Permasan 116, recently developed by Monsanto Chemicals Ltd., Waterloo Place, London, S.W.1, is calculated to reduce warping, splitting and other changes attendant on rapid variations in the moisture content of wood, and is also said to protect timber against fungi and insects. It consists of penta-chlorophenol formulated with water-repellent substances in suitable organic solvents. The open-tank cold-dip method of application is generally satisfactory if dipping times are varied to suit the absorptive capacities of the different kinds of wood. Timber already in position can be treated by two liberal brush coatings at intervals of 6–12 hours (**17**; 20.2.54).

X-ray treatment of the timbers of Nelson's flagship, H.M.S. *Victory*, against death-watch beetle [cf. *For. Abstr.* 14 (p. 375)] has been found to be impracticable because of the magnitude of the dosage required, the difficulties of application, and the danger to human beings, for whom lethal dosages are about $\frac{1}{100}$ those required for insects. Fumigation with methyl bromide has now been sanctioned by the Admiralty. The Forest Products Research Laboratory and the Pest Infestation Laboratory are to co-operate with the Naval authority and a commercial firm in carrying out the treatment (**17**; 13.3.54).

Hungary. The 20-year afforestation plan launched in 1950 is well under way. The object is to raise the forest area from 3,360,000 acres or 12.6% of the whole land area, to 20%. Replanting of devastated forest land and shelterbelt planting are the methods chiefly used (shelterbelts will form more than 40% of the whole acreage planted). Planting machines are generally used and 83 million trees were planted last autumn (**13**; March 1954).

India. A process for the preservation and canning of Bamboo shoots has been perfected at the Central Food Technological Research Institute, Mysore. There are vast stretches of Bamboo forest, and in many of the Bamboo clumps, curved or misshapen shoots are formed. The tender parts of these shoots can be preserved in brine for use as pickles or in curries (**9**; 3.4.54).

Italy. A new method of grafting conifers has been devised, which avoids many of the difficulties usually encountered. Scions are dipped into melted paraffin wax and then into cold water, which produces a transparent coating that inhibits transpiration long enough for callus formation to take place (**10**; Feb. 1954).

Malaya. Experimental plantations of Batai [*Albizzia falcata*] for pulpwood are to be made. Tests made by the Colonial Products Advisory Bureau [cf. *For. Abstr.* 15 (Nos. 2032–3)] have shown that it is commercially possible to produce a high-grade paper by mixing Batai pulp with a higher grade pulp. The great advantage of Batai for this purpose is its rapid growth—it is fully grown at 10 years old (**12**; Dec. 1953).

Sweden. A process by which heartwood resins can successfully be eliminated from Pine wood, thus making possible the use of Scots Pine in sulphite pulp, has been developed by the Stora Kopparberg Company after nearly 30 years of experiments, and the new method is being tested on a large scale at the company's pulp mill at Skutskär (**14**; Feb. 1954).

Switzerland. Very good results in protecting young trees against browsing have been obtained by dusting with a strong-smelling organic synthetic substance, Anti-Morsures Maag. In trials against deer browsing, Spruce have been dusted in winter and deciduous trees in summer. The amount of the substance needed varies with the density and age of the stand, 300–500 g. sufficing to treat one are of young Spruce. Two treatments, one after the first snow has disappeared and the second after the thaw in February/March, are generally sufficient (**7**; Feb. 1954).

U.S.A. The Secretary of Agriculture has authorized the use of the International Decimal $\frac{1}{4}$-inch Log Rule for scaling timber in national forests. The use of a decimalized scale effects considerable saving in time and labour (**11**; March 1954).

The Pulploader, a pulpwood loading device designed as an attachment to a fork-lift truck, enabling the operator to load both sides of a railway flat from one position, is being manufactured by the Clark Equipment Company, Benton Harbor, Michigan. Operation is completely hydraulic and is controlled from the driver's seat. The device tilts $92\frac{1}{2}$ in. from the vertical and can be raised to a height of 26 ft. 10 in. Spliced load cables support the load and are freed by operation of a hydraulic hook release. A unit of pulpwood, usually $1\frac{3}{4}$ cords, can be lifted from a lorry and placed on the flat in one operation (**1**; Feb. 1954).

The U.S. Forest Products Laboratory at Madison has developed a method of heating veneer logs ready for cutting within 20 min., as against the 48 hr. required by the usual methods of heating in steam or hot water. The new method uses the log itself as a heating element in a high-voltage circuit. Power consumption is heavy but wastage is low because practically all energy consumed is used to heat the wood. If the method is eventually adopted by industry, safety devices to reduce the hazards involved in the use of electric currents at high voltages will be essential (**20**; Feb. 1954).

A new ceiling panel also developed by the Laboratory consists of a paper treated with synthetic resin to strengthen and waterproof it and made into a 1-in.-thick honeycomb to which are glued thin facing panels of veneer of Douglas Fir affected by white pocket rot. Two offices at the laboratory have been equipped with these ceilings which, it is reported, effectively deaden sound; the holes and white pockets in the veneer reduce sound echoes and give an interesting finish to the panels (**18**; Feb. 1954).

The Ivory Pine Co., Dinuba, Calif., is experimenting on the conversion of Fir bark to fertilizer. The bark is loaded into a lorry and the driver applies a treating solution containing N-fixing bacteria and NH_3 to the top of the load at a rate of $\frac{3}{4}$-gal./ton. The concentrate of N-fixing bacteria is an English product, Fertosan Compost Accelerator. The loads of bark are dumped in elongated piles about 5 ft. high, approximately 1200 tons being accumulated in 5–6 months. The product is being tried on vineyards and farms in the San Joaquin Valley (**18**; Feb. 1954).

U.S.S.R. Experiments in eradicating moss were recently carried out in the Lisinsky forest in the province of Leningrad. Ordinary commercial slaked lime in powdered form was applied at rates of 10–250 g./sq. m. Applications of 10–25 g. caused slight injury to sphagnum shoots, 50 g. killed 30–50% and injured a further 40%, 100 g. killed all sphagnum shoots, 100–250 g. eradicated all mosses. No damage was observed to any other plants. The slaked lime must be applied to the growing sphagnum shoots since it is the contact of lime with the growing points of the mosses that causes their death (**19**; March 1954).